

tents—p. 61
ied Screw Threads—p. 66
and Diemaker Training—p. 72
t Treating Be-Cu—p. 78
welding Electrode Charts—p. 85
ular Cast Iron—p. 97
ustrial News Summary—p. 132
l Pricing Controversy—p. 135
parison of Prices—p. 172

The

IRON AGE

Illinois U Library

FEBRUARY 24, 1949

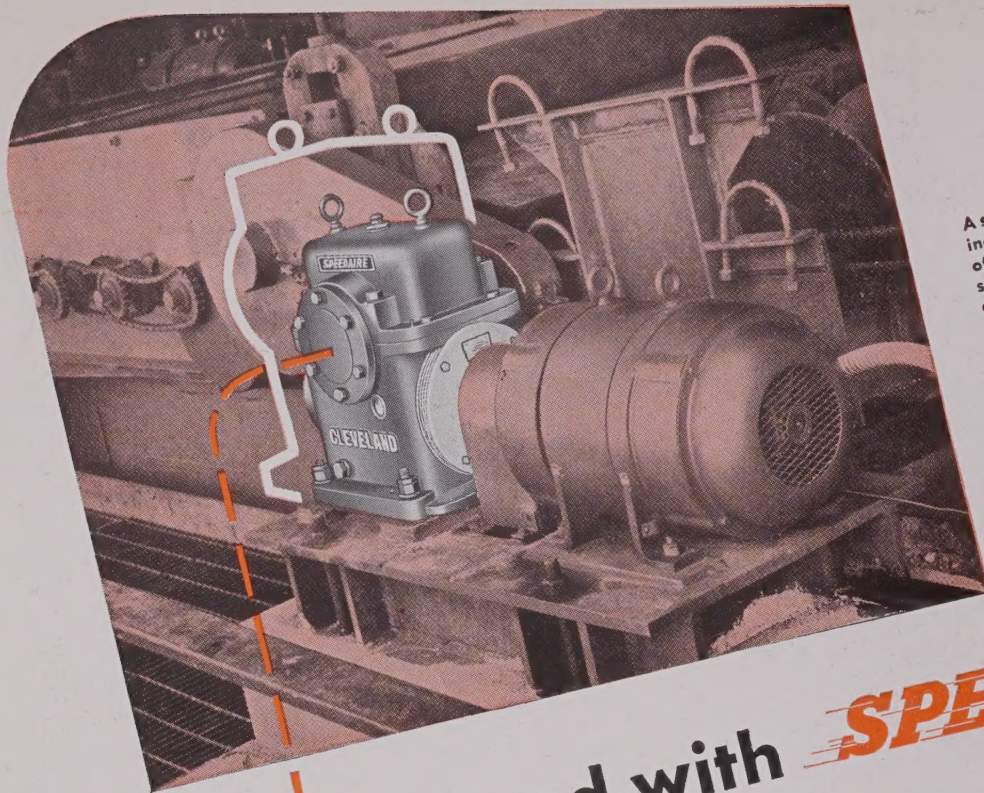
Nothing Rolls Like a Ball



You couldn't select a finer bearing

NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE · Division of GENERAL MOTORS · BRISTOL, CONNECTICUT



As the white outline indicates, a standard unit of nearly twice the frame size would be required to do the work of Speedaire.

28% of cost saved with **SPEEDAIRE**

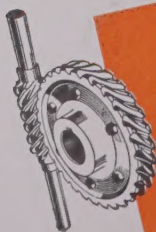
THIS Speedaire is installed in a well-known Ohio steel mill. It drives the rolls of a pickler through which steel sheets pass before hot dip galvanizing.

In selecting Speedaire for this job, the company saved three ways: It *saved dollars*—28% of the cost of a standard worm-gear speed reducer. It *saved weight*—36.6% of the floor load. And it *saved space*—50% of the room required to accommodate a conventional unit.

Speedaire is Cleveland's new fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work—will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds. It can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands.

For full description, send for Catalog 300. The Cleveland Worm & Gear Co., 3252 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.



CLEVELAND

Worm Gear

Speed Reducers

"More pieces per tool grind

with Gulf L.S. Cutting Base"
says this Foreman

Costs Down-Production Up!

"We've sharply reduced time per piece, improved surface finish, and greatly extended the number of pieces per tool grind since we switched to Gulf L.S. Cutting Base," says this Foreman of Main Screw Machine Products, Inc., Waterbury, Conn.

"On our new $\frac{3}{4}$ " automatics we are performing two turning, one threading, and one cut off operation on a steel clock part at the rate of 1.2 seconds per piece. With the cutting oil we used previously the time per piece was much higher."

"Just as important to us has been the increased number of pieces per tool grind. With Gulf L.S. Cutting Base we are now running 16,000 pieces before regrinding of the tools is necessary. Add the fact that we are getting better finishes, and you can see why we're gratified by our experience with this fine cutting oil."

Here's another example of how the proper application of the right Gulf quality cutting oil improves production and lower costs. To make sure that you're getting all the benefits possible through the use of more suitable cutting oils, call in a Gulf Lubrication Engineer today.

The Foreman of this progressive shop (left) consults with a Gulf Lubrication Engineer on results with Gulf L.S. Cutting Base in machining clock parts.

Gulf Oil Corporation • Gulf Refining Company

Division Sales Offices:

Boston • New York • Philadelphia • Pittsburgh • Atlanta
New Orleans • Houston • Louisville • Toledo



Gulf Oil Corporation • Gulf Refining Company
3800 Gulf Building, Pittsburgh 30, Pa.

IA

Please send me, without obligation, a copy of your pamphlet "The new improved Gulf L.S. Cutting Base."

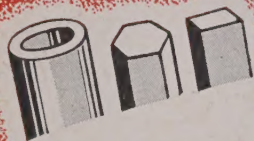
Name.....

Company.....

Title.....

Address.....

BRASS



PIPE • FITTINGS
SHEET • PLATE
ROD • BAR



TUBING
ROD
SHEET



SHEET • TUBING
ANGLES • ROD
BAR • CHANNELS

LEVINSON

STEEL SALES CO.

34 PRIDE STREET • PITTSBURGH, PA.

LSS-1

Fatigue Cracks

BY C. T. POST

Logic

• • Right here and now it might as well be understood that readership of your favorite family journal carries with it risks as well as benefits. You might even arrive at the shop some morning and find a 16-ton dead—very dead—whale tied up outside the door. You'll have to admit that could happen to no one but a loyal f.f.j. reader.

Louis Lavoy, president of Louis Lavoy, Inc., has read your f.f.j. for years. Presumably, the production information supplied by the brains department is invaluable in the Lavoy shipyards, which dominate Brooklyn's Sheepshead Bay. Reader Lavoy was inhaling the salt breezes as he hustled down to work one morning last week when he got a whiff that definitely was not salt breeze. Rounding a corner he saw the whale tied up to one of the piers he leases to commercial fishermen.

As we get the story, one of the fishermen was sailing the briny deep when, without aid of radar, he located the whale. On the current market, the rendering plants pay \$150 per whale. So the fisherman threw a line around it, towed it back to Reader Lavoy's pier. Before he could market it, the Coast Guard, noses held high, declared it was "a menace to navigation," tied it to a seaward-bound cutter. Reader Lavoy resumed reading his f.f.j.

Just as surely as you become a man of distinction by drinking Lord Calvert, the law of cause and effect holds that you will find a dead whale in your front yard if you persist in reading your f.f.j. Don't come blubbing to us if you do.

Same Old Story

• • Remember the tale of the San Francisco physician who hooked up a photo-electric cell whereby his headlights would activate a mechanism opening and closing his overhead garage doors (Fatigue Cracks, June 24, 1948)? One evening he found them madly rolling up and down just as the setting sun hit headlight level. Remember the companion piece, where another San Francisco gadgeteer hooked up a radio transmitter in his car to actuate a relay setting his garage doors in motion (Fatigue Cracks, August 26, 1948)? One day, when his garage doors began opening and closing he discovered that airplanes contacting the San Francisco airport were operating on the same wave-length.

The February 19 *Saturday Evening Post* contains an article by Wesley Price on "Dutch" Kindelberger, guiding genius of North American Aviation, Inc. Kindelberger, according to Price, also had some ideas about garage door mechanisms:

"...he put a radio transmitter in his car, one mouse-power, and a receiver in the garage. Pressing a button on the car's dash signaled the door to move. One night in Washington, Kindelberger had a long distance call from his wife, Helen. 'The door is going up and down, up and down, up and down. Oh, Dutch, what can I do?' Kindelberger guessed that a radio ham was sending on his garage door frequency. He discarded the transmitter."

Too bad you had to make that long distance call, Helen. After this remember to keep a copy of your f.f.j. handy to solve all problems of the home or plant. As Mr. Price possibly can tell you, there's no telling when it will come in mighty handy.

Oops!

• • Just as surely as your f.f.j.'s news dispensers attend cocktail parties, there's always an admiring throng eager to get the inside story on the titans of industry in the day's news. And after the third or fourth round of lubrication, it's a hardy reporter who doesn't start to spout.

One of the by-line boys, who candidly admits that his evaluation of the days happenings is on the nail, was cornered at such a gathering by a young fellow whose name he caught as "O'Rourke." The lad wanted to know all about D. R. Biggie (we'll call him), head of one of the country's largest industrial concerns.

"That stupid lug," whispered the newshawk, "wouldn't know enough to come out of the rain if it wasn't for his secretary." And then he went on in explicit detail about Biggie and the secretary.

"Well, what about James F. Orrion, the executive v.p. who resigned last week?" the youth inquired.

By this time our reporter was anxious to be off in the direction of the hors d'oeuvres. He cut the conversation short with "Orrion was the smartest man in the whole outfit. He saw what was going on, then got out."

The young fellow grabbed the reporter's hand. "Glad to hear you say that. I'm Jim Orrion's oldest son, you know."

finishes?

drawing properties?

tolerances?

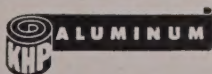
KHP ALUMINUM...

surface appearance?



... meets the most exacting specifications

Whether the emphasis be on drawing properties, tolerances, finish or surface appearance, it's KHP for aluminum. Specify KHP aluminum for your operations, and be assured of consistent quality and dependable deliveries. Our metallurgical department is always ready to serve you—may cut your costs through sound advice. Call us today.

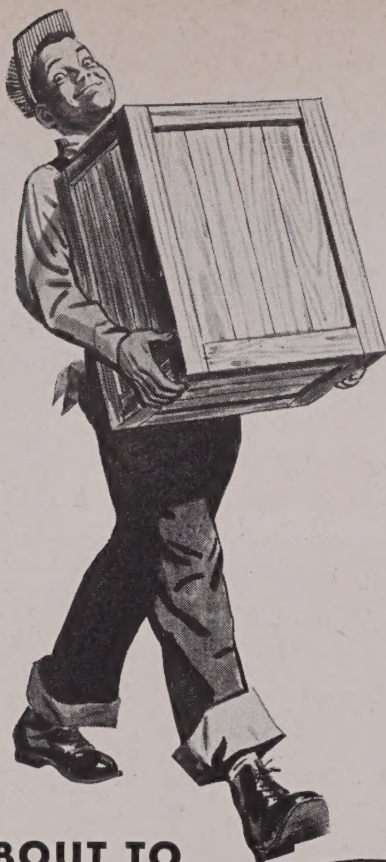


KHP PRODUCTS ARE: Cold rolled and hot rolled strip—shim—sheet steels • Annealed spring steels • Tempered and polished spring steel • Tempered feeler gauge steel • Cold finished bars • Drill rod • Electrical sheets • Precision tubing—cold drawn seamless—welded—stainless and alloy tubing • Aluminum strip and sheets • Extruded aluminum and magnesium tubing—shapes—mouldings • Rolled magnesium plates • KHP SERVICES: Edge rolling • Slitting • Square shearing • Flattening, straightening, cutting.

KORHUMEL • HEFFRON & PREISS STEEL CO.

2428 Oakton Street • Evanston, Illinois • AMBASSADOR 2-6700
Rockford Phone Enterprise 1266 • Teletype Evanston 1675

WAREHOUSES: MINNEAPOLIS • MILWAUKEE • MT. VERNON, N.Y. • SALES OFFICES: DETROIT • ST. LOUIS • LOS ANGELES



SAM IS ABOUT TO

STRIKE OIL

Slipping accidents will happen — unless a regular program of prevention is enforced. You can carry out such a program, quickly and at low cost, with Wyandotte Zorball*.

Zorball is the all-purpose floor absorbent that gives an immediate anti-skid surface to stained and soaked floors. It absorbs oil, water, paint, acids and other liquids that contribute to dangerous floor conditions. Slipping and fire hazards can then be literally "swept away."

Zorball is nonflammable. Even when saturated with oil, it resists burning. It will not break down and form "mud," either. It's harmless to fabrics, wood, metals, rubber and to the skin of those who handle it.

Safety calls for Zorball. Why not call your nearest Wyandotte Representative for details?

*Wyandotte Zorball is listed by Underwriters' Laboratories, Inc.

WYANDOTTE CHEMICALS CORPORATION

WYANDOTTE, MICHIGAN • Service Representatives in 88 Cities



Dear Editor:

INDUSTRIAL RESEARCH

Sir:

I found the article "Research" in the Jan. 6 issue very interesting and think you are to be congratulated on an excellent job. I was, however, very surprised and disappointed to find you in effect recommending the use of tax-supported and tax-exempt facilities for the gaining of private advantage by individual taxpaying companies. I was further disappointed in your vague reference to criticism of this situation. The independent industrial research and development laboratories throughout the country have objected to this practice for a considerable period of time. The article, it is true, points out that spokesmen against such industrial research placement "have raised some valid objections." However, the inference of this statement is that some criticism is not valid, and it therefore has a tendency to discount all criticism against such action.

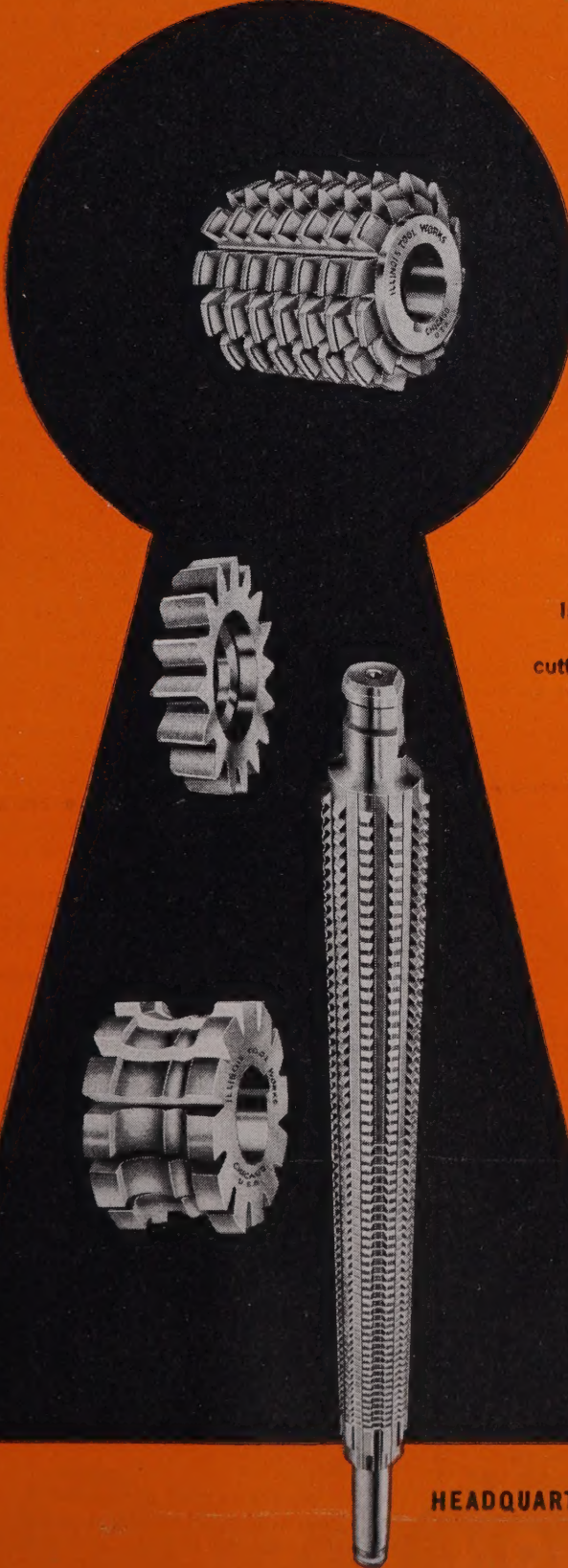
It seems to me that the use of direct or indirect public support for private gain is wrong—and this is exactly what is transpiring in the case of the research service offered by these tax-supported or tax-exempt organizations. The universities should devote their entire effort to teaching and to basic research. That is, professors' time and university equipment should not be diverted to applied research on specific industry problems. That the universities recognize this is shown by the use, in many cases, of the subterfuge of organizing a separate nonprofit, therefore nontaxpaying, affiliated institute. This among other things puts them in competition with themselves and with industry for the services of the trained scientists that they say are so scarce.

As I say, to find IRON AGE failing to take a stand on this important point was disappointing. Furthermore, I would like to have seen the article point out that the lack of profit incentive as well as the lack of industrial knowhow and industrial experience at universities should be expected to lead to slow and impractical results from research programs placed at such nonprofit, nontaxpaying organizations. The independent research and development laboratory must have and does have a profit incentive, a staff with industrial experience and practical knowhow.

LESLIE S. FLETCHER
Technical Director

Sam Tour & Co., Inc.
New York

● The intent of the article was to report the possibilities open to small business for
(CONTINUED ON PAGE 54)



the key

TO CUTTING TOOL EFFICIENCY

Ingenuity . . . Skill . . . Experience—these are the qualities to look for in selecting your source for precision metal cutting tools. At ILLINOIS TOOL WORKS, master tool makers and experienced tool engineers, working with modern production and testing equipment, place these vital intangibles at your disposal. For more than thirty-seven years . . . in almost every major metal working industry from precision bearings to giant turbines . . . ILLINOIS TOOL WORKS has cooperated in reducing costs and improving quality through the development of specially engineered cutting tools. Bring your cutting tool problem to "Headquarters" . . . our engineers are at your service!

ILLINOIS TOOL WORKS

2501 North Keeler Avenue, Chicago 39, Illinois
In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario



HEADQUARTERS FOR ENGINEERED CUTTING TOOLS

T-J CYLINDER

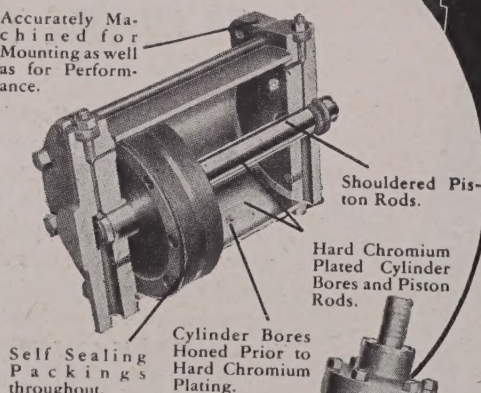
EJECTS 6-TON STEEL COILS

**Saves Labor...Speeds Production...
Cuts Costs!**



**T-J Built to "TAKE IT"
on Tough Jobs!**

Accurately Machined for Mounting as well as for Performance.



Here's another example of T-J Cylinders doing a job of power movement for industry... efficiently... accurately... automatically. This machine is an Aetna Standard Roll Type Coiler, which employs a T-J Air Cylinder to eject steel coils weighing up to 12,000 lbs.! As the strip of steel is completely coiled, kick-out fingers operated by the cylinder raise the coil and push it forward where it rolls on to conveyor.

T-J Air and Hydraulic Cylinders are built for 1001 tough jobs like this, where pushing, pulling or lifting is needed... 100 lb. or 50,000 lb. Available in many standard sizes and styles... both cushioned and non-cushioned types. Backed by 32 years' experience... built for long-life dependability. Write for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.

**FOR
POWER MOVEMENT
IN ANY DIRECTION**



**100 LB.
or 50,000 LB.**

carrying out research to maintain competitive position—certainly the universities and nonprofit institutes are offering such service—and was not an attempt to evaluate the different type laboratories. For one thing, the author refrained from recommending any particular type laboratory since, from the point of view of the business executive to whom the article was slanted, the type of research involved would be a major factor in determining the best placement of the research contract. Furthermore, the pros and cons of the points raised by Col. Fletcher would, in effect, have required another article of equal length, and space limitations precluded their inclusion. For a further statement of Col. Fletcher's points and a rebuttal from the other side of the fence, the article "Industry-Sponsored University Research," Chemical & Engineering News, July 12, 1948, is recommended.—Ed.

DISCOVERY OF STAINLESS

Sir:

Published in the Oct. 14 issue was an article on the origin of stainless steel, entitled "Who Discovered Stainless Steel," which interested me particularly. I would appreciate it if you would send me two copies of the article.

A. PORTEVIN
Technical Director

La Revue de Metallurgie
Paris, France

VIBROMETERS

Sir:

This office would greatly appreciate having the names and addresses of manufacturers of vibrographs or recording vibrometers which could be used in studying ship hull vibrations in the range from 1 to 12 cycles per second.

LT. COMMANDER PERRIN
Asst. Naval Attache

Ambassade de France aux Etats-Unis
Washington

● A list of manufacturers of such units has been mailed.—Ed.

MOTOR MAKER

Sir:

Have you ever heard of, or seen ac single phase motors, which are called Line or B-Line or some similar sounding name? If so, could you advise who makes them.

CHARLES F. PERNER

Dunrite Service Co.
New York

● Brown-Brockmeyer Co., Dayton, makes a motor called the B-Line which is probably the one you're referring to.—Ed.

WROUGHT IRON ROLLING

Sir:

We are in need of genuine wrought iron angles, channels, squares, flats and rounds. We are also interested in knowing if any mill rolling wrought iron makes any flat bars or squares with round corners having approximately an 1/8 in. radius. Can you fur-

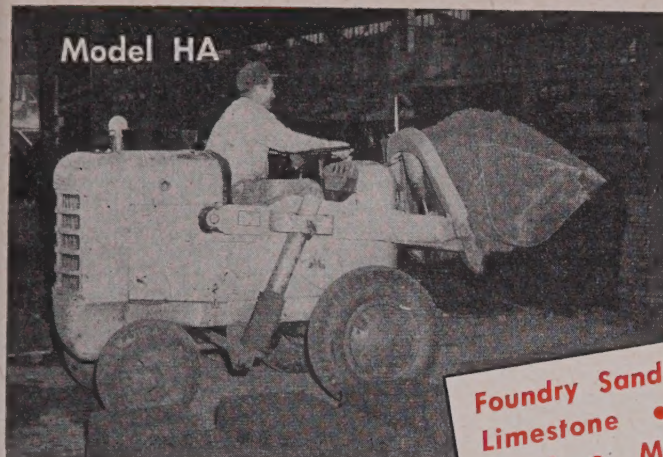
T-J

32 YEARS EXPERIENCE

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

BULK MATERIALS HANDLING SIMPLIFIED



Model HA

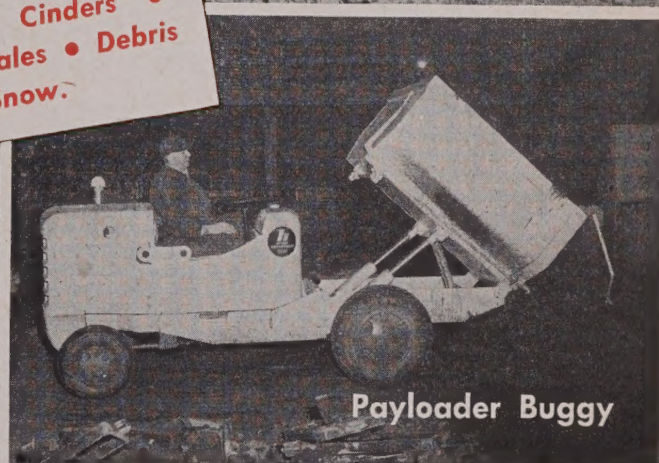


Model HF

Foundry Sand • Coke
Limestone • Castings
Coal • Metal Scrap
Forgings • Cinders •
Barrels • Bales • Debris
• Snow.



Model HL



Payloader Buggy

HOUGH PAYLOADERS Designed to Handle Bulk Materials

Bulk materials of any kind can become bottlenecks in any plant. Are you equipped to scoop up, carry, lift and unload your mass materials quickly and cheaply? Do you require expensive containers for your ingredients, parts or bulk products in transit? How much do you handle with each operation?

Hough PAYLOADERS are designed and built just for this purpose — to move the largest quantities of bulk materials in a single operation—to operate in congested areas — with simplicity and speed. Scoop up your loose materials in PAYLOADER's even-keel bucket, move them without spilling in and out of box cars, through narrow aisle ways, and through mud and soft ground if you wish. Load your materials into any hopper, container or bin — high or low — by means of its dust and noise reducing dumping mechanism. PAYLOADER's hydraulically

controlled dump release has numerous industrial advantages.

The same PAYLOADER unit which will really solve your major bulk material handling problems will likewise be an overtime workhorse for plowing and loading snow, cleaning yards, levelling waste dumps and grading. PAYLOADERS are dependable — because they are the result of materials handling experience since 1920. The Frank G. Hough Co., 733 Sunnyside Avenue, Libertyville, Illinois.

SEND FOR FREE LITERATURE on any of the four sizes of PAYLOADERS: the 10½ cu. ft. Model HA, the ¾ yd. Model HF, the 1¼ yd. Model HL or the 1½ yd. Model HM — also the 2 yd. Payloader Buggy.



HOUGH PAYLOADER

Manufactured by THE FRANK G. HOUGH CO.



MUSIC

Spring Wire



Uniform by all the measurements of quality spring wire. Rigid control of chemical composition and processing methods assure its uniformity and structural soundness. Our specialized coiling, twist and bend tests are added safeguards of dependability.

You can depend on Keystone Music Spring Wire — as well as our other manufacturers' wires — to satisfy your most exacting requirements.

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

nish us with a list of mills rolling this material?

Also please send us copies of ASTM standard specifications A7 and A10 for steel and A42, A162 and A41 for wrought iron.

FRANK J. MUETH
Aluminum & Architectural Metals Co.
Detroit

● Names of possible suppliers of rolled wrought iron merchant bars have been sent. For the ASTM specifications, you can obtain them directly from American Society for Testing Materials, Philadelphia. There is a nominal charge for copies.—Ed.

CONVERSION TABLE

Sir:

We are interested in obtaining a chart for converting millimeters into inches. We would appreciate your supplying us with such a chart or recommending where one can be found.

J. ERNEST MARTIN
Purchasing Agent
Sutton Engineering Co.
Bellefonte, Pa.

● A conversion table for your purpose is in the mail.—Ed.

PRICE STATISTICS

Sir:

For a survey we require the prices of certain materials such as pig iron, structural steel, bar steel, steel sheets, coal, copper, lead, tin, zinc, aluminum, rubber, lumber, etc. To develop these price curves, we would like to have these prices as of Sept. 1938, April 1945, April 1946, April 1948 and Oct. 1948.

H. A. STECHEL
Consulting Engineer
Teaneck, N. J.

● Tear sheets of "Prices and Production," the statistical section of the annual review issue dated Jan. 6, have been mailed. The prices you require for a number of the commodities are given in this tabulation.—Ed.

CUTTING TOOL METALLURGY

Sir:

Please send a copy of "Metallurgy and Heat Treatment of Cutting Tools" from the Jan. 13 issue.

HOWARD MARVIN
Manufacturing Research
Packard Motor Car Co.
Detroit

NONFERROUS ALLOY SPECS

Sir:

Please send us two copies of the booklet Nonferrous Alloys Specifications, for which we enclose 50¢.

E. A. FREY
Purchasing Agent
City Engineering Co.
Dayton

CENTRIFUGAL CASTING

Sir:

It would be appreciated if you would send us a set of tear sheets on the article "New Mold Coating Widens

SINCE 1846

BAIRD HIGH PRODUCTION MACHINES

- For producing articles made of wire, ribbon metal, castings, forgings or cut off bar stock.
- BAIRD 76H Chucker is an Automatic 7" Six Spindle, Indexing, Horizontal Lathe with different speeds available at the work spindles for different operations in the one handling of a piece and with other time saving features.
- BAIRD 54VC Lathe is an Automatic 5" Four Spindle, Vertical Continuous Machine for many light or finishing cuts on parts, as facing ends or chamfering grooves on pistons, etc.
- BAIRD 12-Station Duplex Turning Machine is for such as turning the four trunnions on the "spider" or journals for universal joints and boring and facing the yokes of such joints.
- BAIRD Multiple Transfer Presses for multiple operation in one handling on articles made from ribbon metal.

BAIRD ALSO MAKES

- BAIRD Four Slide Wire and Ribbon Metal Forming Machines in many sizes to cover the thousands of articles made from wire and ribbon metal.
- BAIRD Tumbling Equipment for deburring, smoothing, cleaning, polishing, ball burnishing, heated drying, etc.

Send samples of each article you want to make in quantity.

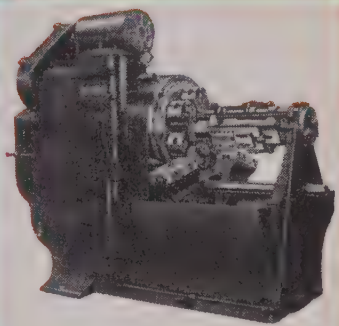
State the quantities to be made of each piece you want to make in a given time.

Give electrical current specifications AND

Ask Baird About It



BAIRD 12 STATION DUPLEX TURNING



BAIRD 76H CHUCKING MACHINE



BAIRD 54VC LATHE

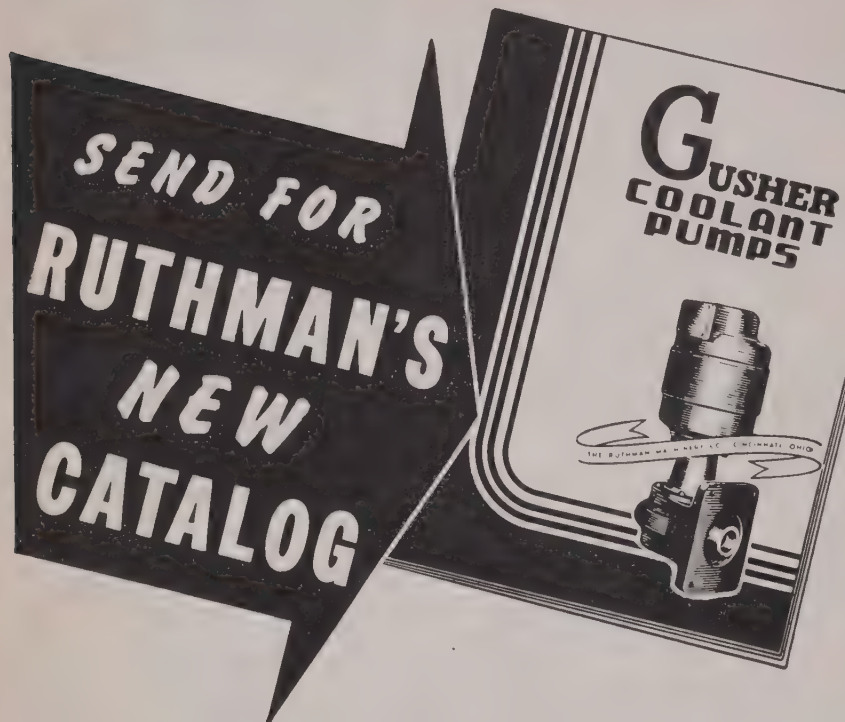


BAIRD MULTIPLE TRANSFER PRESS



THE BAIRD MACHINE COMPANY
1700 STRATFORD AVENUE
STRATFORD, CONN.

on COOLANT problems HERE'S THE ANSWER!



To solve your coolant problems, both as to efficiency and economy.

Ruthman Gusher Coolant Pumps incorporate the latest advances in design with years of practical experience in producing better coolant pumps.

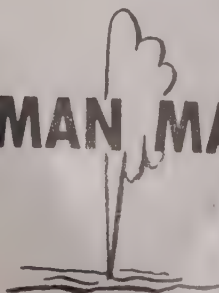
Send for Ruthman Machinery's new catalog today. You will find it invaluable in choosing the correct coolant pump for your metal working machines.



THE RUTHMAN MACHINERY CO.

1821 READING RD.

CINCINNATI, OHIO



Centrifugal Casting Use" appearing in the Dec. 2 issue. Also we would like copies of the three parts of the article "Metallurgical Aspects of Ball Bearing Steels" which appeared in the Sept. 2, 9 and 16, 1948 issues.

R. M. SANDBERG
General Manager

Columbia Tool Steel Co.
Chicago Heights, Ill.

CORRECTION

Sir:

A reference to a DuPont plant in Newsfront of the Jan. 27 issue was called to my attention. There is evidently some confusion over it and we thought you would probably wish to have it accurately in case of future need.

The item refers to equipment at a DuPont celanese plant in Bishop, Texas, built of stainless steel which is now falling apart. The reference must be to a plant of some other company, although our people say they do not know which one it would be. DuPont does not make celanese and does not have a plant of any kind in that section of Texas.

We do not wish to cause any embarrassment, but we thought you would wish to have this information in case anything should arise again in connection with that plant.

TREMAIN F. ROBINSON
Public Relations Dept.

E. I. duPont de Nemours & Co., Inc.
Wilmington, Del.

● Our apologies. The item was definitely scrambled. The plant at Bishop making celanese is owned by the Celanese Corp. of America. During the war it was necessary to put in some stainless clad equipment, even though plant engineers knew at the time that it was a misapplication for the particular purpose. Valves and other equipment have by now deteriorated to a point where substitution is necessary.—Ed.

FORMING MAGNESIUM SHEET

Sir:

Please supply us with a copy of "Hot Forming Magnesium Sheet" which appeared in the Nov. 18 issue.

W. J. JACKEL
Manager, Welded & Special Products
Engineering Div.

American Car & Foundry Co.
Berwick, Pa.

BALL BEARING STEELS

Sir:

I have just read the third part of the very interesting article entitled "Metallurgical Aspects of Ball Bearing Steels" which was in the Sept. 16 issue. I have been unable to find the two preceding issues, containing the first two parts, however, and would appreciate receiving tear sheets.

R. W. BLAIR
Asst. Project Engineer

Wright Aeronautical Corp., Div. Curtiss-Wright Corp.
Wood-Ridge, N. J.

THOMAS L. KANE

Publisher

B. H. HAYES

Production Manager

O. L. JOHNSON

Manager Market Research

CHARLES T. POST

Manager Circulation and Reader Service

J. R. HIGHT

Promotion Manager

Executive Offices

Chestnut and 56th Sts.

Philadelphia 39, Pa., U.S.A.

Editorial and Advertising Offices

100 E. 42nd St., New York 17, N. Y., U.S.A.

Regional Business Managers

FRED BANNISTER ROBERT F. BLAIR
W. Hartford 7, Conn. Cleveland 14
62 La Salle Road 1016 Guardian Bldg.

C. H. OBER PEIRCE LEWIS

H. E. LEONARD Detroit 2

New York 17 103 Pallister Ave.

100 E. 42nd St.

B. L. HERMAN STANLEY J. SMITH

Philadelphia 39 Chicago 3

Chilton Bldg. 1134 Otis Bldg.

J. M. SPACKMAN R. RAYMOND KAY

Pittsburgh 22 Los Angeles 28

814 Park Bldg. 2420 Cheremoya Ave.

One of the Publications

Owned and Published by

CHILTON COMPANY

(Incorporated)

OFFICERS AND DIRECTORS

JOS. S. HILDRETH, President

EVERIT B. TERHUNE Vice-President

P. M. FAHRENDORF Vice-President

JULIAN CHASE Vice-President

THOMAS L. KANE Vice-President

G. C. BUZBY Vice-President

CHARLES J. HEALE Vice-President

WILLIAM H. VALLAR, Treasurer

JOHN BLAIR MOFFETT, Secretary

HARRY V. DUFFY T. W. LIPPERT

D. ALLYN GARBER

GEORGE MAISWINKLE, Asst. Treas.

Chilton Editorial Board

PAUL WOOTON

Washington Representative

Member, Audit Bureau of Circulations



Member, Associated Business Papers



Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday. Subscription Price United States, its Territories and Canada \$8; other Western Hemisphere Countries \$15; Foreign Countries \$25 per year. Single copy, 35c. Annual Review Number, \$2.00.

Cable Address. "Ironage" N. Y.

Copyright, 1949, by Chilton Company (Inc.)

Vol. 163, No. 8

February 24, 1949

Editorial

Wanted: An Opposition..... 63

Technical Articles

Transition to Unified Screw Threads.....	66
Strain Gages Measure Roll Force.....	71
Training Tool and Diemaker Apprentices.....	72
Lighting Vital in Handling Operations.....	76
Sales Service Essential to Industry Health.....	76
Lock Design Features Zinc Diecastings.....	77
How to Heat Treat Beryllium Copper.....	78
Direct Nickel Plating of Zinc Diecastings.....	84
Comparable Arcwelding Electrodes.....	85
Magnesium Treatment for Nodular Graphite Cast Iron.....	97
New Books.....	99
Chromizing With Chromium Chloride.....	100
Hot Tearing of Aluminum Castings.....	100
New Equipment.....	101

Features

Fatigue Cracks.....	48
Dear Editor.....	50
Newsfront.....	65
Assembly Line.....	108
Washington.....	112
West Coast.....	116
Personals.....	120
European Letter.....	128
Industrial News Summary.....	132
News of Industry.....	135

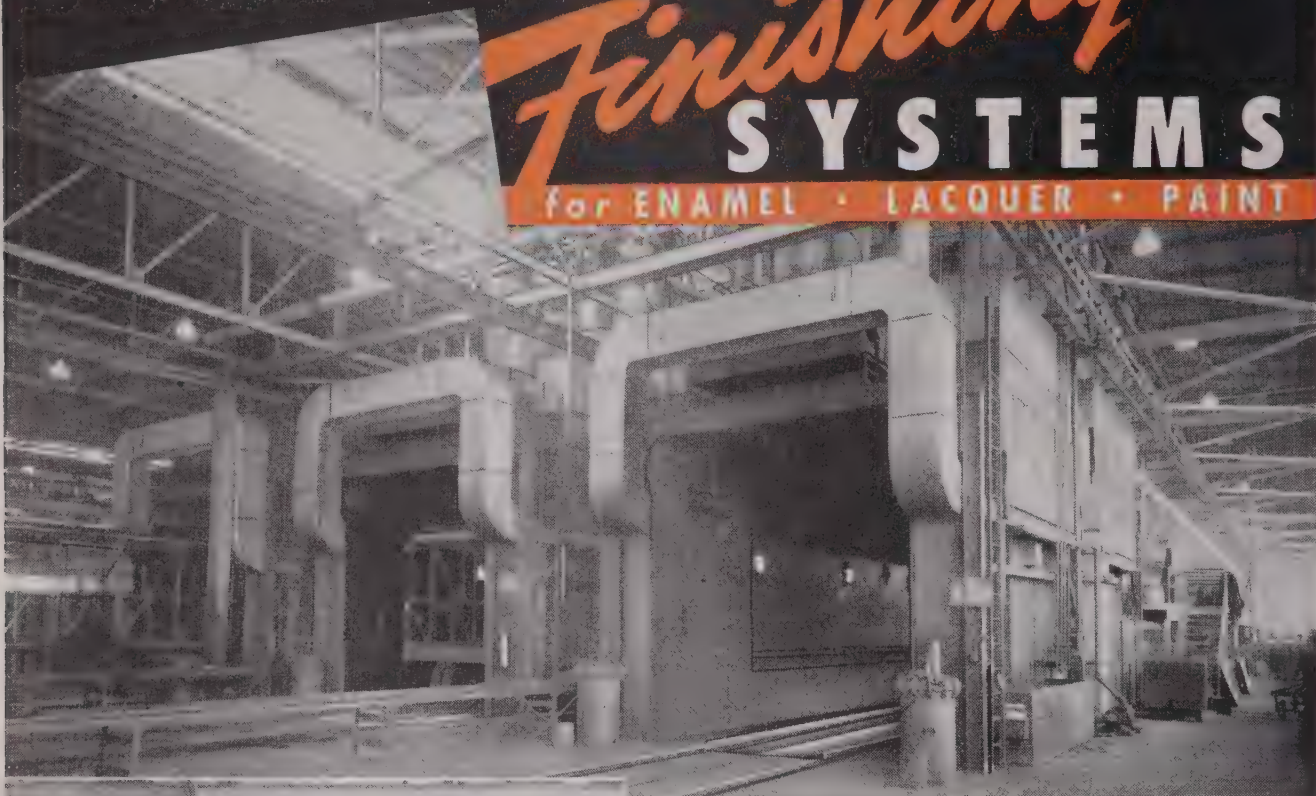
News and Markets

Industrial Briefs.....	138
UN Signs \$23 Million Contract.....	148
January Steel Output Record High.....	150
Attempts to Curb Air Pollution.....	150
Starts Pig Iron Production.....	152
Kennecott Copper Co. Strike Ends.....	154
Permanente Opens Books for Orders.....	156
Copper Tariff is Suspended.....	158
Machine Tool Developments.....	164
Nonferrous News and Prices.....	166
Iron and Steel Scrap News and Prices.....	169
Comparison of Prices by Week and Year.....	172
Finished and Semifinished Steel Prices.....	174
Alloy Steel Prices.....	175
Pipe and Tubing Prices.....	176
Warehouse Steel and Pig Iron Prices.....	177
Ferroalloys Prices.....	178

COMPLETE

Finishing SYSTEMS

for ENAMEL • LACQUER • PAINT



The Top Illustration Shows Mahon Hydro-Filter Spray Booths in Three Prime Coat Painting Production Lines in the Fruehauf Trailer Company's New Plant, Avon Lake, Ohio. Bottom Illustration Shows Completely Assembled Chassis and Body Skeleton Framework Receiving Prime Coat of Paint in one of the Spray Booths Illustrated Above.

. . . Truck-Trailers Too, Receive Their Finish In MAHON Finishing Systems!

The Mahon Finishing System installed in the Fruehauf Trailer Company's new plant at Avon Lake, Ohio, is another excellent example of Mahon Finishing Equipment engineered into a straight line production system to handle completely assembled Truck-Trailers. This complete system in the plant of the world's largest producer of Truck-Trailers, is 1750 feet long and consists of thirteen Hydro-Filter Spray Booths, with Filtered Air Supply, and five Finish Baking Ovens. The prime coating is done on three production lines which converge into two production lines for the finish coat painting and baking operations. If you are contemplating new, modern finishing equipment, remember that Mahon has pioneered development in this highly specialized field for twenty-eight years . . . this broad experience in every industry, coupled with constant development research, has endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere. Better planning, better engineering, and a better and more economical job of finishing is the result. See Sweet's Mech. Ind. File for complete information.

T H E R . C . M A H O N C O M P A N Y

Home Office and Plant, Detroit 11, Mich. • Western Sales Div., Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning Machines, Rust Proofing Machines, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Units, Drying and Baking Ovens, and Paint Reclamation Units. Also Core Ovens, Hydro-Foam Dust Collectors, and many other Units of Special Production Equipment.

MAHON

100 E. 42nd ST., NEW YORK 17, N. Y.

ESTABLISHED 1855

o o o

February 24, 1949

o o o

THOMAS L. KANE
Publisher

o o o

T. W. LIPPERT
Directing Editor

Editorial Staff

News, Markets Editor T. C. CAMPBELL
Technical Editor.....W. A. PHAIR
Metallurgical Editor E. S. KOPECKI
Machinery Editor.....T. E. LLOYD
Art Editor.....F. J. WINTERS
Ass't News, M'rk'ts Ed. W. V. PACKARD
Associate Editor....H. W. VAN CAMP
Associate Editor....A. D. STOUT, JR.
Associate Editor.....T. S. BLAIR
Associate Editor.....S. D. SMOKE

o o o

Contrib. Editor.....J. S. LAWRENCE

Foreign Editors

England (Contrib.)...F. H. HARLEY
54 Priory Way, North Harrow,
Middlesex, England
Canada (Contrib.)...F. SANDERSON
330 Bay St., Toronto, Canada
Paris (Contrib.).....PIERRE BENOIT
59 Rue Manin, Paris XIX, France

Regional News and Technical Editors

G. F. SULLIVAN
Pittsburgh 22
814 Park Bldg.
D. I. BROWN
Chicago 3
1134 Otis Bldg.
JOHN ANTHONY
Philadelphia 39
Chilton Bldg.
EUGENE J. HARDY
KARL RANNELLS
GEORGE H. BAKER
Washington 4
National Press Bldg.
W. A. LLOYD
Cleveland 14
1016 Guardian Bldg.
W. G. PATTON
Detroit 2
103 Pallister Ave.
OSGOOD MURDOCK
ROBERT T. REINHARDT
1355 Market St., San Francisco 3

Editorial Correspondents

L. C. DEAN
Buffalo
N. LEVENSON
Boston
JOHN C. McCUNE
Birmingham
ROY EDMONDS
St. Louis
JAMES DOUGLAS
Seattle
HERBERT G. KLEIN
Los Angeles

Wanted—An Opposition

WHAT this country needs today is a vigorous opposition party. The whole theory of effective democracy rests on open debate between at least two adversaries presenting the voter with clear-cut opposing briefs.

The Republican Party has failed dismally in this role. The conclusion is inescapable that its particular performance at the polls is the result of failure to give the voter a clear choice. For all practical purposes, the American public is in the same position as the subjects of a totalitarian fuehrer who offers the voters an opportunity to approve a single ticket. Too many Republican politicians are simply offering the voter the same diet which he now gets from the party in power.

Without prejudice to the formula that has kept one party in office for sixteen years, this is not a wholesome condition. The opposition in a democracy has a definite and necessary role. It should challenge the premises of the successful party and subject its conduct to continuing critical analysis. There is no other way for the public, the political jury, to pass on the merits of official conduct.

Responding primarily to the pressure of organized labor, Congress is now weighing changes in the Taft-Hartley act. The problem here reaches deep into our policy and our economic organization. It involves the privileges of a special group, the security of the public, the degree to which labor monopoly shall be permitted to dominate the public interest, the necessary protection of proper bargaining power for labor. It is an issue on which the public stands sorely in need of enlightenment. Instead of full fledged debate with a vigorous exposition of the pros and cons, the public is treated to reports of discrete committee hearings. Paralyzed by the fear of open commitments, Congress may evolve some compromise which will contain the appearance of public protection and cause minimum offense to powerful labor leaders.

A similar party neutrality hangs like a shroud over foreign policy. In the mistaken belief that a united front must be presented to the world, both parties have avoided criticism and in the process failed to apply the rigorous diagnosis which partisan rivalry affords. What are the merits of the Atlantic pact? Is this defensive alliance based on sound concepts of American security? Are the putative advantages worth the price which will have to be paid in American risk and substance? To whom can the American public look for an honest and competent exposition of this problem? Must we, like the faceless stooges of a totalitarian state, accept the official communiques and meekly submit to the bill?

This attitude of acquiescent and impotent opposition applies to the entire philosophy on which the present administration rode to power in the early thirties. Instead of a clear choice between conservative and so-called liberal, the voter in election after election has merely been asked whether he wants his New Deal under Democratic or Republican auspices. Under the circumstances, it is little wonder that half the eligible voters remain at home. The franchise has become meaningless.

While the Republican Party is waiting for the Administration to commit a fatal error or provide it with a safe issue, it is losing the loyalty and respect of those millions who have supported it in the past, who have looked to it—in vain in recent years—for courageous and intelligent opposition.

Joseph Stagg Lawrence

THIS NEW INLAND BOOKLET

tells the story of modern steelmaking

Packed with information, this new 64-page booklet covers modern steelmaking from the mines to finished steel. It discusses each phase, authentically and comprehensively, in an interesting, easy-to-understand, nontechnical manner. From cover to cover, it is liberally illustrated with sketches, diagrams, and photographs.

Executives who buy and use steel, workers who fabricate steel, engineering students, and others will enjoy reading this informally told story of steel. If a knowledge of steelmaking can help you, mail in the coupon, today.

PARTIAL LIST OF CONTENTS

What is Steel?

Iron Ore

Coal and Coke

Limestone

The Blast Furnace

Steel from Pig Iron

Controlling Ingot
Characteristics

Soaking Pits

The Blooming Mill

Plates, Bars, Shapes

Steel Rails

Continuous Sheet
and Strip Mills

Pack Mills

Cold Rolling

Galvanized Sheet
Steel

Tin Plate

Quality Control and
Research

Steel and Our Na-
tional Prosperity

MAIL THIS COUPON
TO OBTAIN YOUR COPY

INLAND STEEL CO.

Room 1267, 38 S. Dearborn St., Chicago 3, Ill.

Please send me without charge my copy of "How Steel Is Made."

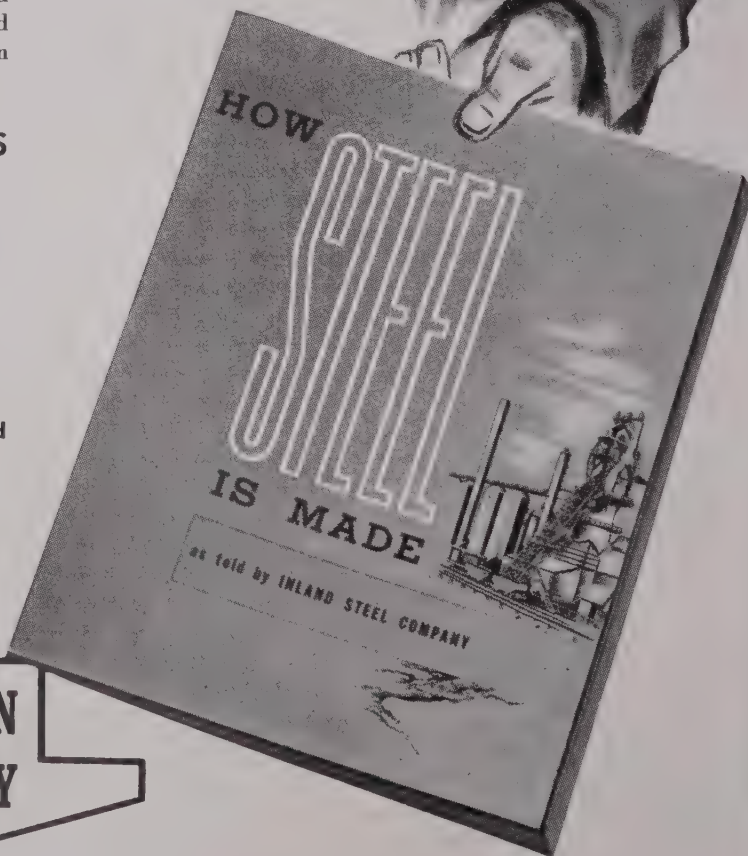
NAME _____

TITLE _____

FIRM _____

ADDRESS _____

CITY _____ STATE _____



INLAND STEEL

PRINCIPAL PRODUCTS: BARS • STRUCTURALS
PLATES • SHEETS • STRIP • TIN PLATE • 4-WAY
FLOOR PLATE • PILING • HI-BOND REINFOR-
ING BARS • RAILS • TRACK ACCESSORIES

February 22, 1949

- ▶ Allegheny-Ludlum will be continuously casting stainless steel within six weeks at Watervliet. Irving Rossi and A-L have concluded license negotiations for a Rossi (Junghans) reciprocating mold machine.
- ▶ The continuously cast stainless steel billet will measure 3 x 15 in. in cross-section, by far the largest size ever attempted in steel.
- ▶ Allegheny-Ludlum is striving for greater self-sufficiency in still another direction. The Blastola (a blast furnace-cupola hybrid) has been purchased from Rotary Electric Steel and is already partially assembled at Brackenridge. With certain design alterations, and working on a 50-50 scrap-ore burden, it soon will be supplying 500 tons of hot metal to electric furnaces at that plant.
- ▶ Babcock & Wilcox Tube Co. is in process of greatly enlarging its continuous casting unit for steel tube rounds at Beaver Falls.
- ▶ Crucible Steel is starting trial runs at its new \$18 million stainless (and carbon) mill at Midland and expects to be in full operation by midsummer.
- ▶ Most spectacular and unique unit in these facilities is the 66-in. single-stand reversing hot mill for supplying hot bands. It is by far the widest mill of this type and is the only such unit ever designed specifically for stainless. Intra-company enthusiasm is running high over results of initial runs on the mill.
- ▶ Zinc-coated paper is replacing aluminum foil for telephone condenser applications by some makers. The zinc is vaporized under vacuum and is deposited on the paper in a continuous process. Original work on this process was done in Germany.
- ▶ Increasing softness in the automobile market is evidenced by all these things: (1) a larger percentage of sales are in the low priced field, (2) larger trade-in allowances by dealers, (3) advertising "immediate delivery," (4) bargain sales of demonstrators, (5) slipping prices on used car lots. The market today may be described as "settling"; if spring sales are disappointing, the present slide could easily become a "fault", according to market experts.
- ▶ A tool and diemaker apprentice program—which won the approval and blessing of the machinist's union—has proven a big help to one manufacturer in combating the shortage of skilled craftsmen in that field.
- ▶ Some of the surplus conversion steel offered in Detroit by an auto maker at \$6.75 per 100 lb is on a tie-in basis. To buy the steel it is necessary to accept a certain amount of nonproductive inventory in the form of auto parts.
- ▶ To reduce the time involved in endurance tests on metals, a practical mathematical formula has been developed to permit calculation of life expectancy for any given overload as well as the stress which the metal can endure for any given length of time. Testing times required to secure the data essential to the equation are much shorter than regular destructive tests.
- ▶ Informed sources believe that with its expanding production of rocket engines, Oldsmobile may be in a position after completing its present plans to make the new engines available to other GM divisions that do not have high compression engines available as optional equipment and at an extra cost.
- ▶ Overall costs of operating industrial trucks have been cut as much as 10 pct by adoption of a practical truck battery maintenance plan developed by one of the battery manufacturers. The program involves a simple control system which, once instituted, insures maximum battery life and maintenance.
- ▶ During the fourth quarter one steel company was compelled to take on some car building tonnage. They had been giving one railroad 100 tons of plates monthly. When they opened their books for the second quarter they found they had a little bonus tonnage. So they offered the railroad 200 tons a month or 600 tons for the quarter. What happened? The railroad took only 365 tons for the whole quarter.
- ▶ Some cost conscious consumers are beginning to agitate for lower steel prices. They contend that steelmaking costs should be \$1 lower for each \$4 drop in scrap prices. This probably won't happen soon. Why? Some other steelmaking costs are still rising, while others have just leveled off. Also steel producers will hesitate to make changes in base prices until after new labor contracts are negotiated.



Transition

By WILLIAM BOYD

*Superintendent, Industrial Fasteners Mfg.
Oliver Iron & Steel Corp.,
Pittsburgh*

viously followed. Canada and Britain had been following a system originated by Whitworth in 1845 and based upon a thread having an angle of 55°, with a thread form consisting of rounded crests and roots. The American system was developed by Sellers in 1846 and followed a thread form having flattened crests and roots with an angle of 60°.

The new Unified Screw Thread has a 60° angle, the same as the present American thread, but the Unified Thread has a rounded root. The crest of the new thread may be either flat, as with the present American standard, or rounded, as with the British standard, since the tolerance and clearance prescribed between male and female Unified Threads will permit interchangeability, regardless. Almost no change was necessary in the number of threads per inch; but a new 1/2-in. coarse thread was added to the American standards, having 12 threads to the inch in addition to the present 13-thread type in current American practice. Three separate, new classifications of thread fit were also established.

Outside of thread form and angle, the greatest change in thread design revolves around the tolerances and clearances established between male and female threads. A set of such limitations has been worked out, assuring that "there can be no interference between threads no matter what matching classes of threads are being assembled," according to William C. Stewart, technical adviser of the American Institute of Bolt, Nut and Rivet Manufacturers.

Two general types of thread fit are established; a relatively easy fit permitted by variations in manufacturing tolerance, plus a prescribed clearance allowance; and a snug fit where no clearance allowance is granted and manufacturing tolerance alone establishes the clearance between male and female threads of an assembly.

Separate classes of thread fit have been established for specific service. The first, known as

FOR 30 years the engineering planners of Britain, Canada and United States have tussled with the problem of making the screw threads of the three nations interchangeable in equipment of each other's manufacture. Finally, on Nov. 18, 1948, representatives of the three nations signed a Declaration of Accord¹ that established a common denominator for screw threads which accomplishes this purpose, once the new standards are in actual use on commercial screw thread production.

The importance of such interchangeability has been emphasized during both world wars when many millions of dollars of ordnance materiel

¹ See "Threaded Products Standardized," THE IRON AGE, Dec. 9, 1948, p. 206.

suffered for replacement parts or repair because of a lack of interchangeability. Commercial export production, too, has always suffered from the situation.

The basis of accord between the three nations regarding a *universal* screw thread design involved the changing of both thread designs pre-

Problems In Producing The Unified Screw Thread

Screw thread manufacturers face the problem of changing production from American Screw Thread Standards to the new Unified Screw Thread Standards. This conversion is expected to cost the industry about \$3 million and take up to five years. The changes in production facilities and gaging and inspection; do's and don'ts in making the change; and the new fits are discussed in this article.

1A and 1B for male and female threads respectively, has almost no application for commercial fastener purposes, but will undoubtedly be a special ordnance thread.

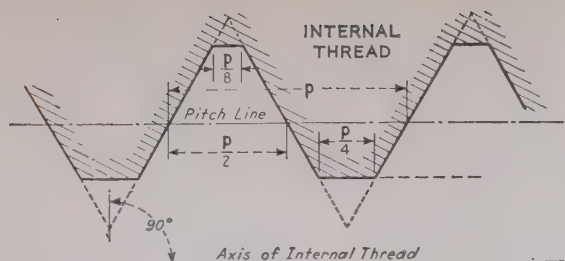
The second class of thread fit, 2A and 2B, is a so-called clearance fit with sufficient allowable clearance in addition to manufacturing tolerances to speed assembly and ideally adaptable to production line assembly operations where speed wrenches are employed.

The third class of thread fit, known as 3A and 3B, are extremely close tolerance fits where no clearance allowance is permitted and very accurate manufacturing tolerances are prescribed. These are expected to be most applicable to uses such as high pressure bolting and similar design problems.

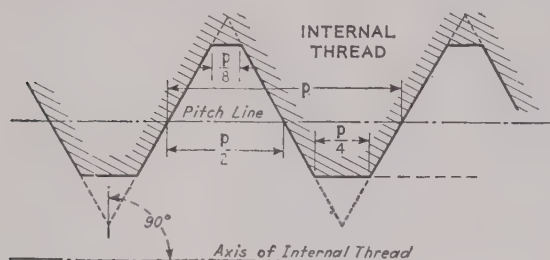
The fastener manufacturing industry's problem in making the changeover to the new standards is one involving a number of considerations. Uninformed estimates of its cost have run as great as \$300 million; but actual estimates place the cost as nearer to \$3 million with a period of about five years as the approximate time required for the changeover by the average plant whose products are made in advance and warehoused for later delivery. Small specialty producers will not encounter nearly so great nor so lengthy a problem, authorities from the industry feel.

For those who warehouse their product before delivery, the problem of the transition centers around the method of changing over production to the new standard with a minimum of lost product and without mixing types of product in either shop or warehouse. At the same time that tools and dies are being changed over, the methods and tools of inspection and gaging must also be changed.

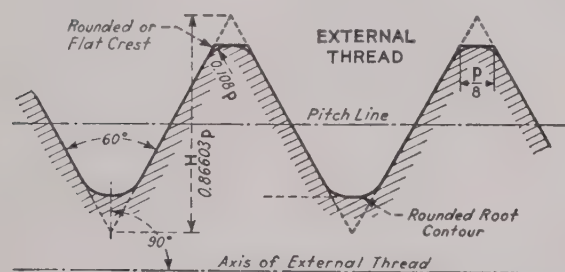




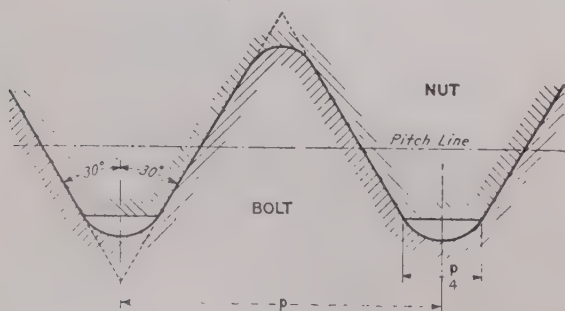
A



B



C



D

FIG. 1—The accord for unification of screw threads provides for interchangeability of threaded parts throughout the United Kingdom, Canada and the United States. Optional details of new thread forms, shown here, include the American preferred form of internal thread (A) with flat crests and roots; the Unified internal (B) and external (C) thread forms with rounded roots and either rounded or flat crests; and the British preferred form (D) with rounded root contours and a flat crested internal thread.

Raw material sizes enter the picture for most companies since slightly smaller cold heading stock (approximately 0.002 to 0.004 in.) is required for certain new fastener sizes. This could be solved by the steel producers furnishing a different range of rod and wire sizes, but it is nearly certain that the present rod sizes will continue to serve and a slightly different drawing practice will be substituted by the fastener manufacturers. This method, if adopted, probably means only new dies at the first reduction stage to adapt to the modified reduction ratio. Conse-

quently, steel companies are not expected to be asked to furnish new green rod sizes.

The actual tooling changeover required in the fastener industry has not been analyzed by any industry authority for publication; but there seems little doubt that some rod and wire drawing dies in the industry will have to be replaced and that the majority of cold heading and extruding dies, taps, chasers and rolled thread dies, will be replaced rather than modified. There will be no foreseeable change in actual machinery or methods.

It would seem, on a superficial examination, that much of this tooling change would not be necessary since the thread angle of the American Standard thread has been retained and the thread form varied only slightly. On closer examination, though, the difference, which cannot be readily remedied in present tools, is the tolerance and clearance allowances. These are radically different.

To sum up the tooling changes that appear to be necessary, the consensus seems to be that first stage wire drawing dies prior to cold heading operations will have to be replaced, because the solid dies commonly used are difficult to modify. The change in pitch diameter of the blanks for cold headed and rolled thread products will require a major change of cold heading and extruding dies. Temporarily, the roll thread dies can be used until depleted, but must be replaced with new standard dies. Cut thread chasers and taps can also be utilized temporarily, but will eventually have to be replaced with the new standard. Hot heading dies will not be affected because no change in blank OD sizes are required by the new standards. Most companies now confronted with the problem are selecting one of three general methods of effecting the transition.

The ideal transition method is to prepare the new tools and dies required for production and make the complete change from the old standards to the new at one time. This is pointed out as the most desirable, mainly because it eliminates all chance for mixing product in production or warehousing. However, for most fastener users, the risk of mixed product is of little consequence since the new thread is interchangeable with any present American Standard thread.

The second method, and one which will undoubtedly be followed by a majority of the industry, is to replace worn tools and dies with the new tolerance tools; thus effecting a gradual changeover. This has advantages of economic importance but risks mixture of product.

The third, and probably one of the most practical methods, is to replace the tooling for a single product at one time, such as machine screws or carriage bolts, and gradually accomplish the change.

Cooperation of the fastener consuming industries will be actively solicited by the fastener makers since a great part of the transition problem rests in the consumer acceptance of the new product. This should present no great problem since, for the average user of fasteners, the complete interchangeability of the new product offers no obstacle to their acceptance. However, there has always been some demand for trouble-

some specialties which will undoubtedly continue to cloud the picture. The U. S. Government is expected to be an immediate and sizable customer since the Class 1A and 1B threads will be standard for ordnance materiel.

Gaging and Inspecting

There are several basic steps required when the Unified Thread is first started in production. Only Class 2A and 2B and the present Class 2 and 3 (present American Standards) will be discussed as the others may be considered special.

When a decision is made to change a specific thread size to the new standards, all of that item should be out of the finishing departments and into the warehouse, if possible, before the new standard is started. Other important first steps are:

(1)—Shop orders must be specific as to the class of fit required, stating actual pitch diameter limits and/or the standard or print to which the order applies.

(2)—Drawing, heading and extruding dies must be inspected and clearly marked as to the size of blank they are expected to produce. This is essential in the case of solid cold heading and extruding dies where the product is unset or extruded to the pitch diameter of the threaded section, as the blank size determines the size of the finished threaded product. Open dies for rolled thread product are not so critical, as some adjustment can be made on the pinch mechanism of the machine. Cut thread dies need no changes

as the thread is controlled at the cutter. This presupposes that the body diameter of the blank is within the major diameter limits of the thread.

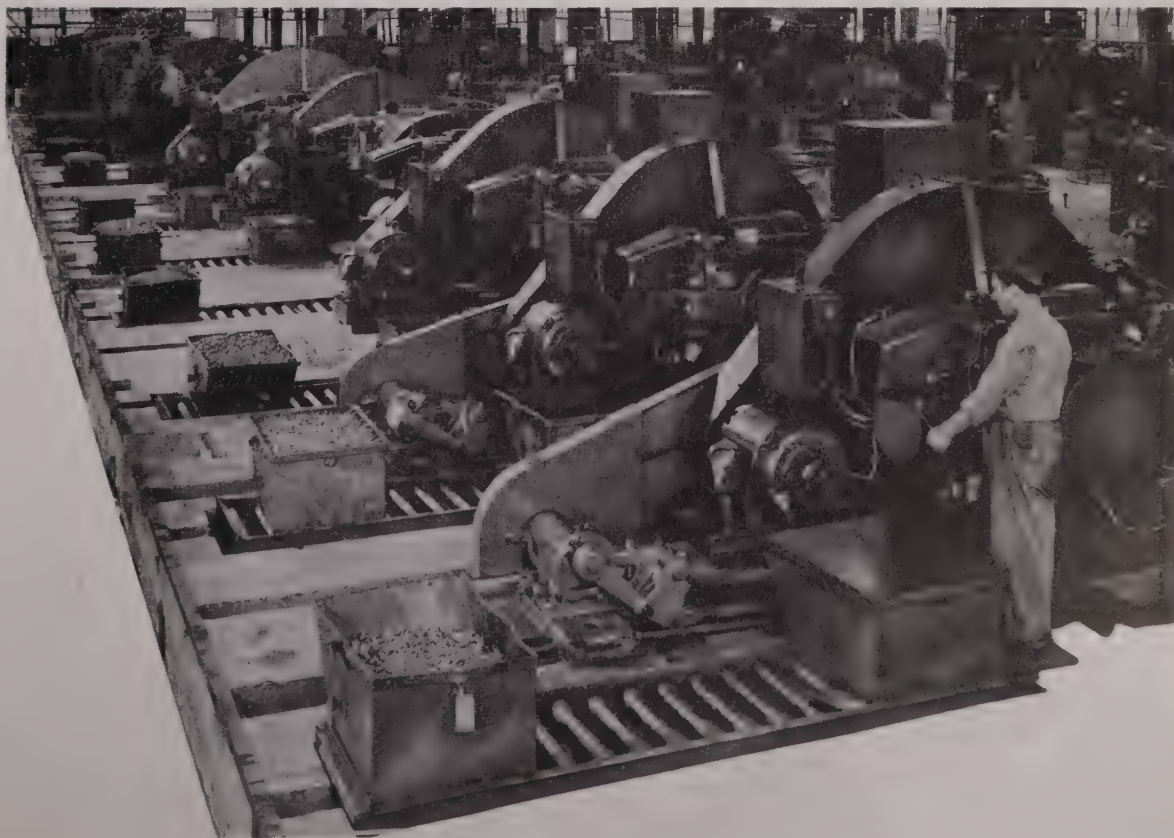
It may be that after a decision has been made to change a product from Class 2 to Class 2A, a number of dies to Class 2 tolerance are in stock. Good shop practice requires that dies be started on the minimum. Therefore, these dies could be used, as the minimum of Class 2 is greater than minimum for Class 2A, but is considerably under maximum Class 2A.

As an illustration, $\frac{1}{2}$ in.-13 working tolerance using Class 2 dies to make Class 2A product is equal to 0.4485 in. max., (Class 2A) minus 0.4448 in. min. (Class 2) or 0.0037 in. total tolerance. This is about equal to old Class 3. Assuming these dies are tungsten carbide, such as used in the boltmaker or the extruder, there is no need to worry about not getting full production because of size, as these dies, as a rule, break down under fatigue before they increase appreciably in size. If Class 2 steel dies are used for making Class 2A product, only about 70 pct of the normal production can be expected because of the limited working tolerance.

(3)—Roller dies must be checked for thread form and lead. Thread chasers also must be checked for thread form and lead.

(4)—Gages must be procured for Class 2A external thread to both *Go* and *Not Go* limits. Present Class 2 and Class 3 gages remain the same, as these classes have been retained without change. Only *Not Go* gages will be required

FIG. 2—Typical of the boltmaking equipment in use today is this line of cold headers. Wire size must be accurately checked into the header because improper wire size would be difficult to get into the solid die and quickly ruin it.



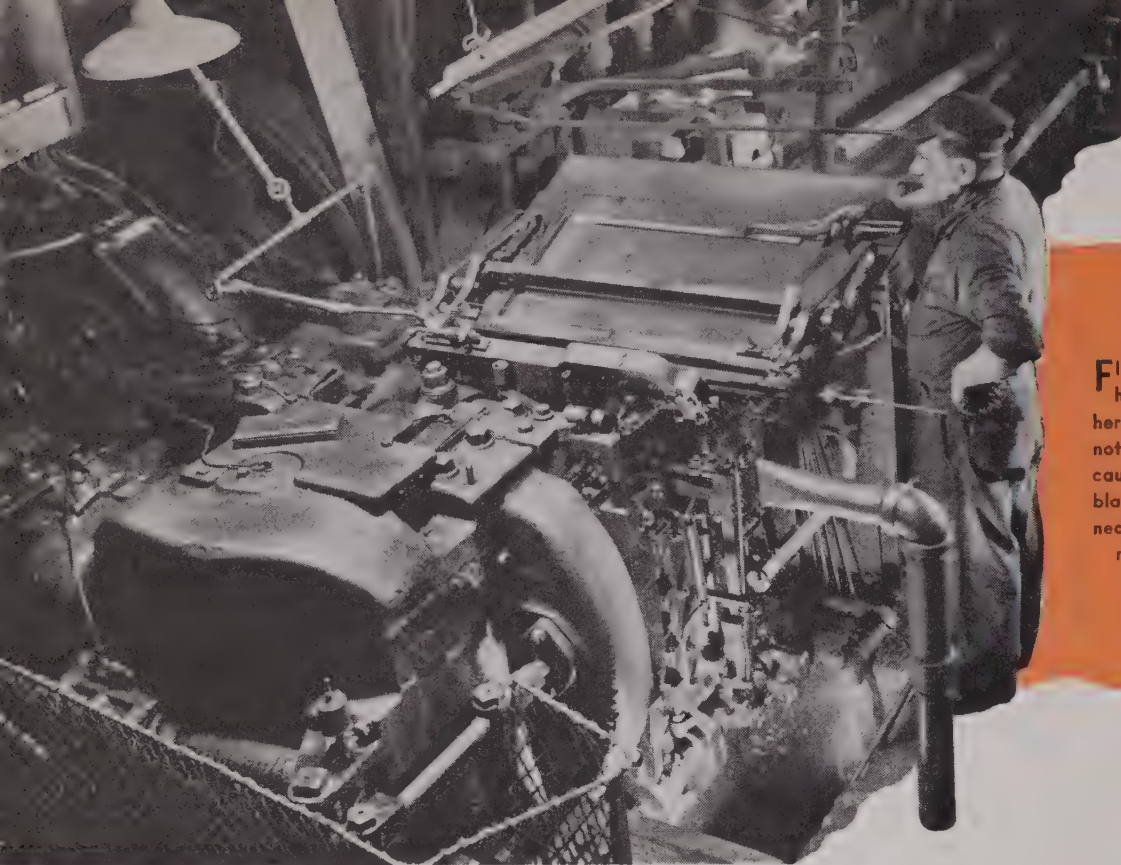


FIG. 3 — In hot heading, as shown here, the dies will not be affected because no change in blank OD sizes are necessary under the new standards.

for Class 2B internal thread, as the *Go* gage is basic, the same as Classes 2 and 3, and is therefore interchangeable with these classes.

It would be possible, if operators and inspectors in the plant were trained to use pitch micrometers, to check the thread pitch diameter with pitch micrometers and use the basic gage to check for so-called ringers or no-lead condition. But this is only a stop gap method and is not recommended. It should only be used as a last resort where gages are not available, and then only by trained personnel.

There is no need to go into the problem of gage control as this is one which should be familiar, but suffice it to recommend that means should be arranged to check regularly all working and inspection gages and record the date of such inspection. It is the inspector's duty to see that the proper gages are at the machine when the product is started.

If tools for a particular order have been properly prepared and checked, then and only then is it certain that the product will start right at the machine.

Most attention to product inspection and control will be confined to the cold headed product, as nearly all hot headed products, except track bolts, are made cut thread.

It is understood that railroad track bolts will continue to be made to hand free fit or wrench tight fit, as the case may be.

Inspection of cold headed product must start with the proper wire size. Wire size must be checked into the header, as improper wire size can quickly ruin tools. As an illustration, the wire size for making a 1/2-in. upset rolled thread,

Class 2 product, is 0.440 to 0.442 in. diam, whereas the new Class 2A wire size will be approximately 0.438 to 0.0440 in. diam. If 0.442 in. diam wire were to enter at the header for Class 2A product, difficulty would be encountered in entering the solid die as there would only be 0.0014 in. clearance, not sufficient for entry. It is imperative that wire size be checked and properly tagged for identification.

In the case of the boltmaker where the double extrusion process is used, it will not be necessary to use any different wire size than now being used, as the first station die will still remain the same. The change will be in the second station die.

The next step in control is that the header operator, after he is satisfied with his setup, get the inspector to check and approve it for production. After the inspector has given his approval to run, it is then the operator's duty to see that his product is held within the specified limits and the inspector's duty to periodically check the work. Patrol inspectors may be employed, each with a certain number of machines to cover so that all machines can be checked at least once every hour. If the blanks are to be trimmed and extruded, the same procedure must be followed. Boltmaker product is selfcontained and, therefore, can be controlled in its entirety at the boltmaker.

With the cold headed and extruded product the problem is quite different. At this point, the greatest care in supervision and inspection must be exercised.

As the product comes from the header, it must be properly tagged for identification. Containers

must be clearly identified, and this identification must be maintained throughout all operations. It cannot be stressed too strongly that the product must be kept separate and identifiable; because a box of Class 2A product mixed with Class 2 or 3 will give considerable difficulty in rolling a satisfactory thread because of the variation in blank diameters.

As the material moves into the finishing department, the inspector again steps into the picture. It should be the inspector's duty to check each tote pan or shop box of material before it is dumped into the thread roller hopper to make certain the blanks are the proper size. His next step is to see that the roller dies are of the correct form and properly set. If the roller dies are properly set and the blanks are the proper size, the subsequent thread will be correct, as with the proper setup, whatever the blank pitch diameter is, that will be the PD of the thread; and by the same token PD controls major diameter. This can be checked quickly with pitch micrometers and ring or snap gages. Periodic checks can be made by the operator with thread gages and the inspector with pitch micrometers or other suitable gages to see that the original setup is maintained. Visual inspection should be sufficient to denote excessive die wear.

Up to this point the cold headed, rolled thread product has been dealt with. Cut thread product does not present the same problems with regard to the thread. Whereas rolled thread product must of necessity be controlled from the start at the header, cut thread blanks are made and will continue to be made full size; and heading and inspection procedure at the header on this product should remain the same.

It is at the thread cutter that proper care must be taken. Inspection of cut thread product can be more critical than rolled thread, as there are

a number of things that are harder to control on cut thread, such as lead, taper, angle, and eccentricity. Chaser wear is a factor in thread cutting that has a bearing on the quality of the product and must be watched carefully.

The inspector must see that the operation is properly set up before proceeding with production and that proper gages are at the machine. Thereafter, the operator makes periodic checks with his gages; and the inspector also checks to see that the setup is maintained.

Just as much care must be exercised in keeping the cut thread product separate and properly tagged and identified as was used in the blank product, for now the work is ready to go to the heat treating department. Here, again, care must be exercised to keep the product separate. There will be some product which will by-pass the heat treating where heat treating is not required.

Electroplated bolts and screws will, of course, be inspected and checked with basic gages, as this is one of the reasons for the allowance on Class 2A external threads. A word of caution might be given here to those who may be using thread ring gages on plated work. If difficulty is encountered in gaging product after checking a few pieces through, check the gage for metal pickup, as the major diameter clearance in the gage is often altered by filling up with plating material.

So far we have dealt only with the external thread, as internal threads can be controlled with proper gages at the tapper. It is then a matter of keeping the product separate and identified as to class.

If the procedure and care outlined here is followed, the product should arrive at the nut assembly and packing departments properly identified for packing and warehousing or shipping.

Strain Gages Measure Roll Force, Torque and Strip Tension

EQUIPMENT using resistance strain gages to measure roll separating force, spindle torque and strip tension in an experimental British cold-rolling mill is reported to have proved very satisfactory, and extension of the systems to commercial mills is anticipated.

For the direct reading of strip tension, a torque meter of the strain gage type was set between the reduction gear and the drum of the coiler. In addition to this, a device which automatically divides the torque measurement by the coil radius, so that tension and not torque is shown on the meters, was fitted. The equipment operates on 100 v, dc, supplied from dry batteries. Electronic equipment is limited to a single-valve dc amplifier, having a gain of about 4, used only in measuring very low tensions.

To measure load or roll force, a cylindrical load meter, made of high tensile steel and having four strain gages attached, was inserted between the screw and the chock in place of the breaker. The effect of the roll separating force is to compress the cylinder

axially and cause a lateral dilation. The two strain gages which were placed axially will be subjected to compressive stress and the two placed circumferentially will undergo tensile strain. The four gages are connected in a Wheatstone bridge arrangement adjusted to be in balance under the condition of no load between screw and chock. The meter was calibrated in a 50-ton universal testing machine to determine the gage factor, a constant. General accuracy with which load can be measured was estimated to be ± 2 pct.

For determining torque on the mill spindles, four strain gages were placed at a 45° angle to the spindle axis, the direction in which normal strains are at a maximum, and arranged so that the gages would not be responsive to axial or bending loads.

A 10 x 10 in. two high mill at Sheffield University was used for the experiments. A full description of the work is given in a report of the Rolling Committee of the British Iron & Steel Research Assn.

Training Tool and Diemaker

An 8032-hr course under the guidance of a joint labor-management committee includes 144 hr a year classroom instruction, 500 hr drafting, basic engineering and metallurgical training as well as tool room and machine operation instruction and is the basis of this extensive apprentice training course. The course, described by the author, has the approval of the company, the International Assn. of Machinists, the Pennsylvania Apprenticeship Council, and the U. S. Dept. of Labor's Bureau of Apprenticeship.

CRAFTSMANSHIP training has been actively carried on for more than 25 years by Talon, Inc., the world's largest manufacturer of slide fasteners, or zippers as they are more popularly known. Apprentice training programs in both the electrical and tool and die trades are now in operation at the company's Meadville, Pa., plant. Starting with one apprentice tool and diemaker in 1923, management has gradually increased the number of apprentices to keep pace with the steadily increasing production requirements of Talon, Inc.

The present program of apprenticeship, established in 1943, is an amplification and modernization of the system in operation in the plant before the war. Continually on the alert for improvements in training procedure, the company added to the program in 1943 a number of innovations. These additions were made with the assistance of field representatives of the Bureau of Apprenticeship, U. S. Dept. of Labor. Among the innovations was the establishment of a joint management-labor apprenticeship committee that is equally representative of management and the local union of the International Assn. of Machinists. In addition, the work schedule for apprentices was enlarged and improved, and arrangements were made with the local vocational school for regular classes in related instruction. While apprentices had previously attended classes in supplementary instruction, they had done so on their own initiative. The new regulations adopted required apprentices to attend classes at least 4 hr a week, or approximately 144 hr a year.

In September, 1946, a similar joint management-labor program was placed in operation to train apprentices in electrical maintenance work.

Both apprenticeship programs are set forth in writing and registered with the Pennsylvania Apprenticeship Council.

The turmoil caused by the war, with its drastic changes in products, manpower and plans, had an adverse effect on the apprenticeship program. However, through careful planning and supervision, the problems of training craftsmen during this period were largely overcome and the policy of building a reservoir of skilled workers for the future was continued, although on reduced scale.

Cooperating with the apprenticeship committee in conducting the program is a full-time Apprentice Supervisor. It is his responsibility to see that all apprentices are adequately trained in each work process and moved from one operation to another as they advance in their skills. He meets with the joint committee, and confers with them on training matters. He maintains a record of the progress of apprentices during each step of their training, which he submits to the committee and to the Manager of Employment and Training.

The joint apprenticeship committee has clearly delineated functions, most of which are advisory. It advises on the selection of applicants for apprenticeship and determines credits to which they may be entitled for previous experience; reviews reports of the Apprentice Supervisor on the progress of apprentices; and hears and adjusts complaints of violations of apprenticeship agreements by either the apprentices or those in charge of their training.

Apprentices at Talon

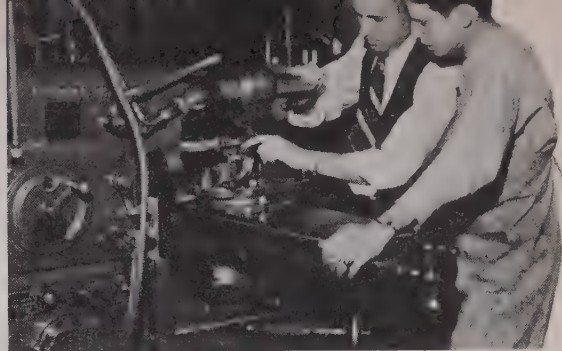


FIG. 1—A Talon tool and die maker apprentice being shown how to mill a form on a blanking punch.

By REGINALD PERRY
Bureau of Apprenticeship,
U. S. Dept. of Labor,
Washington

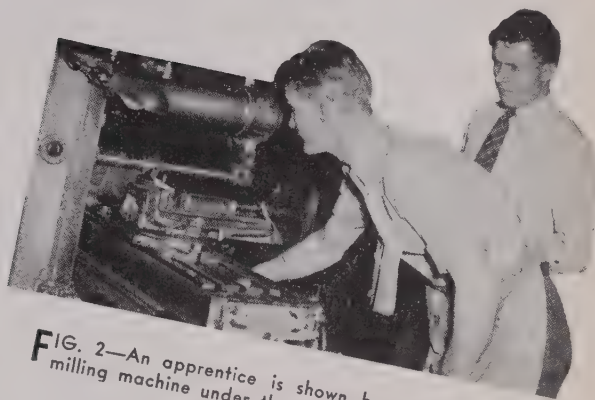


FIG. 2—An apprentice is shown here operating a milling machine under the supervision of the supervisor of apprentices.

Talon apprentices are selected on the basis of interest in the trade, potentialities as indicated by previous school and work records, and results of a battery of tests conducted by the training supervisor. These tests measure mental alertness, mechanical aptitudes and personality traits. A consulting psychologist evaluates and analyzes the tests to assure proper placement.

The selection pattern now being used was agreed upon by the joint apprenticeship committee. An applicant must be an American citizen of legal working age and physically fit for the work of the trade; and a high school education or its equivalent is preferred. The applicant's complete record is reviewed by the joint apprenticeship committee that advises for or against employment. The accepted applicant's previous experience, which might be directly applicable to the apprentice training schedule, is evaluated and the committee recommends the amount of credit to be given in each case. Preference is given to veterans and to applicants already employed by the company. This thoroughness and care in selection has resulted in a remarkably low turnover.

Before starting training, each apprentice is given an opportunity to read the provisions of the apprenticeship program, so that he may have an overall picture of what it includes and what is expected of him. He then signs an apprenticeship agreement, which is also signed by a repre-

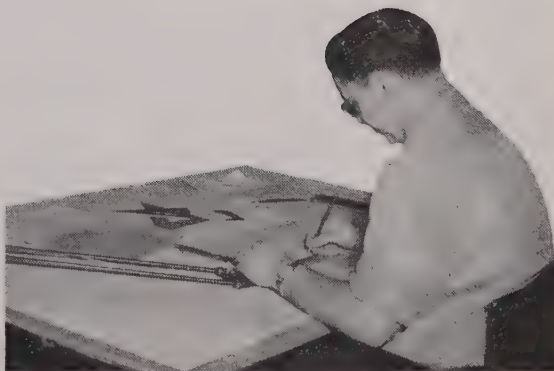


FIG. 3—Under the apprenticeship program, each apprentice is required to spend 500 hr in the drafting room of the Engineering Dept. under the guidance of instructors.

sentative of management and by members of the joint committee. This agreement is then registered with the Pennsylvania Apprenticeship Council.

During the training period each apprentice must acquire certain basic tools. The Veterans Administration allows \$100 toward the purchase of these tools for all veteran apprentices. A complete set of tools is made during apprenticeship. When the apprentice has completed one year of employment as a journeyman with the company, these tools become his property.

The work training schedule in the tool and

NAME	CLOCK NUMBER	WORK FINDING												
		1-3-48	1-10-48	1-17-48	1-24-48	1-31-48	2-7-48	2-14-48	2-21-48	2-28-48	3-6-48	3-13-48	3-20-48	3-27-48
Church, D. L.	32161	7	7	7	7	7	B	B	B	B	B	B	B	
Leshner, W. J.	4738	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	
Ladner, P. R.	6655	E	E	E	E	E	HT	HT	HT	HT	M	M	M	
Rounds, W. F.	24224	L	L	L	L	L	L	L	L	M	M	M	M	
Redmond, D. E.	30276	MA	MA	MA	MA	MA	CG	CG	CG	CG	CG	CG	CG	
Barnard, D. H.	36646	M	M	M	M	M	M	M	M	L	L	L	L	

diemaking trade at Talon includes the following operations over a four year period:

Instruction is given in the metallurgical laboratory in the preparation of samples for microscopic examinations, etching, microphotography, heat treating, examination of parts that failed in production, and in analysis of causes of the failure.

Tool and die repair, advanced grinding, and milling require working to close tolerances. Most of the repair work is on machines designed and developed by Talon engineers, or on standard machinery adapted to special manufacturing processes.

A unique feature of this schedule, as compared with the usual tool and diemaker training program, is the inclusion of 500 hr in the Engineering Dept drafting room as shown in fig. 3. This time is spent in revising drawings in accordance with engineering improvements under the supervision of journeymen draftsmen and engineers. The last 1500 hr of the apprenticeship term are spent on a variety of the more difficult jobs found in the tool room.

Apprentices attend special classes held at the Meadville Vocational School. These classes total a minimum of 144 hr a year. Course instruction is varied to provide both broad and specific education that applies directly to the craft in which

74—THE IRON AGE, February 24, 1949

they are being trained. The mathematical courses include algebra, geometry, and trigonometry. A course in heat treating includes the basic principles and their application. Elementary and advanced courses in mechanical drawing prepare the apprentice for the job training in the engineering dept.

The joint committee is zealous in seeing that the apprentices attend related instruction classes and poor attendance is reported to the committee for investigation. In most instances, an interview with the apprentice is sufficient to make him realize the importance of regular school attendance. Through frequent consultations among the apprentice supervisor, the director of employment and training, and the local vocational school officials, continual improvements are made in class instruction to make it more interesting and of greater value to the apprentice in his shop work.

The wages of apprentices advance as they progress from one stage of their training to the next. The beginning rate is approximately 55 pct of the minimum journeyman's rate and in eight periods increases to 84 pct during the last phase of the training. At present, a majority of the apprentices employed by the company are veterans, who are receiving, in addition to their apprentice wages,

the financial benefits of the GI Bill (Public Law 346) or the vocational rehabilitation law (Public Law 16).

Accurate, yet simple, records are vital in any apprenticeship program. The progress of the apprentices' work in the plant as well as in the classroom is recorded as is a record of how an apprentice's time is spent on the various jobs, as shown in fig. 4. In addition, several types of records pertaining to attendance, earnings and progress of veterans in the program are maintained for the Veterans Administration.

Graduation exercises for apprentices, conducted with the ceremony of a college graduation, take place twice a year. The company, the union, and the community are mutually interested in this important event. Each apprentice graduate is awarded two certificates, shown in fig. 5, upon completion of apprenticeship. One is issued by Talon, and the other by the Pennsylvania Apprenticeship Council. These certificates are evidence of a graduate's qualifications for journeymanhip in tool and diemaking. In addition to the diplomas, the company gives each graduate a convenient pocket size reproduction of the company certificate and a \$100 bonus.

During the first week of his new status as a journeyman tool and diemaker, the graduate re-



FIG. 5—At the end of the training each apprentice is awarded the two certificates shown here. One is issued by the Pennsylvania Apprenticeship Council and one by the company.

ceives the minimum journeyman rate in the trade. He is then placed in the work for which he is best suited as indicated by his performance records and his rate is adjusted accordingly.

Those who complete their apprenticeship are limited in advancement only by individual ability. Several graduate apprentices now hold responsible positions in the organization as supervisor of apprentices, foreman of the tool room, instructor, and other supervisory positions. The engineering dept. has apprentice graduates in such key jobs as tool designer, tool coordinator, and draftsmen's checker.

Talon tool and diemaker journeymen build and repair machines, dies, and tools that are continually reengineered to include improved methods of production. Although some standard equipment is used, most of the production machines, tools, dies, and fixtures are creations of company engineers.

Company and union officials are well satisfied with the apprentice program as it is now operated. Concerning this program, Grosvenor S. McKee, vice president and works manager, said: "The comprehensive, uniform training received by Talon apprentices, both on the job and in the classroom, has been invaluable in developing the highly skilled workers needed to make tools and dies used in the production of slide fasteners. The apprentice training program has become an indispensable part of our plant operations."

The labor point of view is expressed in the following statement by Donald Needler, president of Local 110, International Assn. of Machinists: "The apprentice program now in operation is exceedingly gratifying and its effectiveness has been proved by the calibre of workers graduated from the course. I feel sure that the management, members of our union, graduate journeymen, and present apprentices are in full agreement as to the invaluable benefits of the program."

Lighting Vital in Handling Operations

Good lighting is an important factor in obtaining efficient and economical material handling, according to A. A. Brainerd, illuminating engineer, Philadelphia Electric Co., author of a paper presented at the recent Materials Handling Conference in Philadelphia. The paper described the role lighting plays in materials handling operations.

Perhaps the most spectacular phase of the effectiveness of good illumination in materials handling, Mr. Brainerd said, is the increased economy of floor space. When lighting conditions are right, a crane or truck driver can see quicker and judge distance more accurately. Instead of placing a load or driving a truck in the approximate location desired, good seeing conditions enable him to work with a high degree of precision. Painting the insides of bins a very light color greatly increases light utilization.

Modern lighting systems, especially those using extended light sources such as the fluorescent lamp, tend to eliminate shadows so that variation in brightness becomes less effective as a means of determining form and location. Modern lighting design frequently utilizes the principle of painting the machines and other objects in the room in off-white colors of contrasting hues. This not only assists in identifying an object, but also enables one to judge distance more accurately. A specific example is that of a large high bay area covered by several large overhead cranes. Under flat lighting with a dark gray finish, the visibility was sometimes so low that cranes collided. After these cranes had been painted in a light buff, no further trouble was experienced.

Mr. Brainerd's paper also discussed in detail the types of lighting systems available and how to determine the proper system to use.

Sales Service Essential to Industry Health

The role of sales engineers of the materials handling equipment manufacturers in the present market was discussed by T. O. English, assistant general purchasing agent, Aluminum Co. of America, Pittsburgh, in the paper "The User Talks to the Sales Engineer."

Pointing out that present trends in cost have created an increased demand for cost-reducing equipment, Mr. English foresees a ready market for materials handling units and a healthy business index for the industry after others have begun to slide.

The responsibility of the industry's sales engineers, however, was the author's primary concern, for without reliable service the industry will

endanger its position. Because of the nature of the product, manufacturers of materials handling equipment are often required to give advice on a wide variety of engineering problems. It takes a competent man, therefore, to be an effective sales engineer, especially in recognizing the suitability of units for specific operations. The author emphasized that there is no substitute for current practical experience as the key to sound service engineering.

In closing, Mr. English urged recognition by the industry both of its favored position and its considerable obligation to its customers, and suggested that cooperation within the industry is essential for strengthening its overall position.

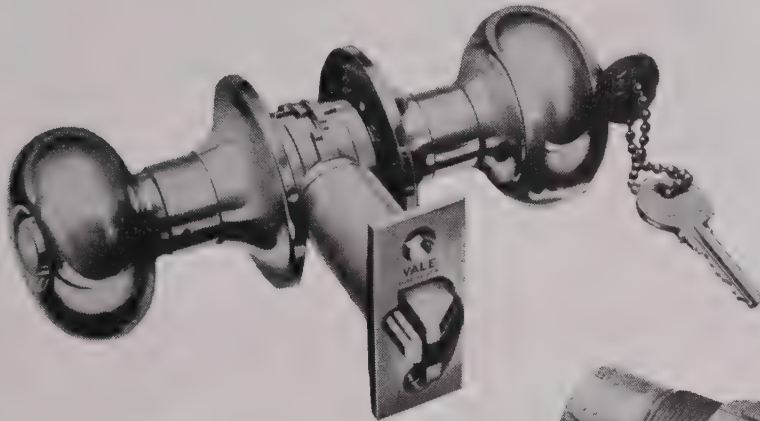
Lock Design Features Zinc Diecastings

AN OUTSTANDING example of the effective use of diecastings is the new heavy duty tubular lock produced by Yale & Towne Mfg. Co., Stamford, Conn. This lock, shown in an accompanying illustration, contains 20 zinc diecast parts. Some of these parts are shown in the illustrations.

Reasons for the use of these zinc diecastings, according to Yale & Towne engineers, include (1) ability to hold dimensional tolerances and minimize

machining requirements, (2) economic reproduction of parts with irregular shapes, holes, core recesses, and varying section thickness, and (3) ability of the process to provide cast-in inserts such as threads, pins and other locating devices economically.

Most of the diecastings used in the lock are subject to little or no wear and all have more than enough strength to resist the stresses encountered.



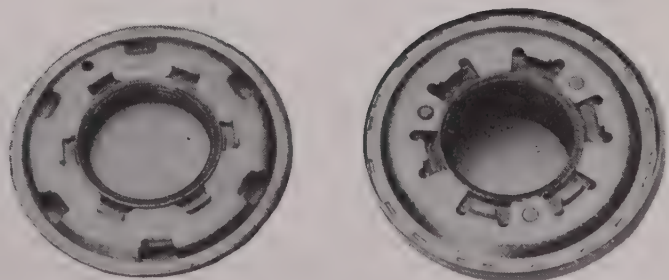
LEFT AND BELOW

ASSEMBLED lock is shown at the left. Zinc diecastings immediately below, with interlocking jaws, are mating halves of the main tubular housing. Part below these halves is one of the housings for the bolt.



ABOVE

INTERNAL parts of the assembly, shown above, require irregular shapes and integrally cast parts such as threads, studs, pins and other locating elements.



RIGHT

DIECAST nuts, at the right, are spun or riveted to stamped lock plates and mated to form a spool that centers the lock cylinder inside the knob.

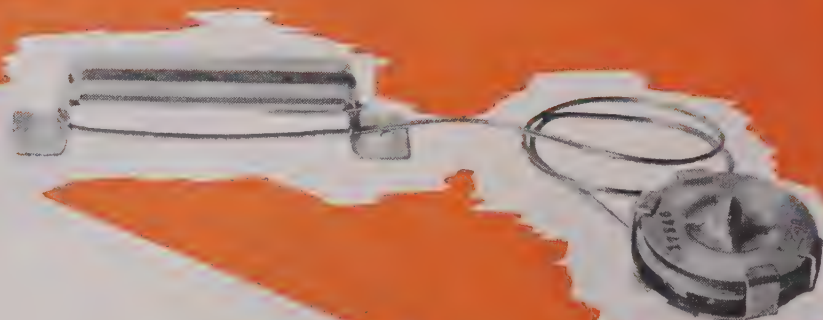


How to Heat



Beryllium-copper alloys obtain their optimum properties by means of heat hardening or by a combination of cold work and heat hardening. Recommendations covering hardening procedures, including handling techniques, are presented in this article, supplemented with comprehensive physical property data. Equipment requirements are also discussed from the viewpoint of metallurgical suitability and rate of production.

TYPICAL gas-fired box type furnace used for hardening beryllium-copper parts. Forced convection insures rapid and uniform heating of charge.



OPTIMUM properties of beryllium-copper alloys are obtained only through proper heat treatment. Quenching from the solution-annealing range, which softens the material, followed by treatment at a lower temperature, which hardens these alloys, permits forming of intricate shapes in the soft condition followed by hardening to maximum properties. This ability of beryllium-copper to respond to heat hardening offers an advantage over alloys that gain all their strength from cold work, because the formability of strain-hardening alloys is invariably low in the tempers giving maximum strength.

Beryllium-bearing, copper-base alloys may be classified on the basis of high strength or high conductivity. Table I shows the composition of some of the beryllium-copper alloys commercially available. Since high-conductivity alloys are usually supplied by the mill in the fully-hardened condition requiring no heat treatment by the fabricator after forming, the following discussion will be limited to the standard high strength 2 pct alloy.

Although the hardening of beryllium-copper is

accomplished through a two-step heat treatment, the fabricator will ordinarily be concerned only with the low temperature hardening operation, because the first step (solution anneal and quench) is carried out in the mill prior to shipment. For certain special applications requiring severe forming, such as deep drawing, it may be necessary to provide an intermediate anneal, since beryllium-copper, like other copper-base alloys, hardens from cold work.

Materials deriving all of their strength through cold working, in addition to offering poor formability at their highest strengths, may require a stress-relieving heat treatment. Since beryllium-copper can be stress relieved in its hardening range during heat treatment, no special operation is needed to remove undesirable residual stresses. An important advantage of beryllium-copper over certain other age-hardening alloys is its simple heat treatment which can be carried out at low temperatures in an uncontrolled atmosphere without subsequent controlled cooling. In order that full use may be made of available properties, the type of hardening treatment selected should be

Treat Beryllium - Copper

based upon the requirements of the particular application.

All beryllium-copper alloys obtain their properties by means of heat hardening, or a combination of cold work and heat hardening. Since the final properties of these alloys are improved by cold work before hardening, it is advantageous to use the highest temper that can be formed. Temper may be defined as the amount of cold reduction in B&S gage numbers after the last anneal.

The effect of heat hardening on various properties, shown in tables II and III, indicates that heat treating increases strength, hardness, conductivity and modulus. For a given temperature in the hardening range, these changes proceed with time; some reaching a peak and decreasing with additional time, while others continue to increase with time. Raising the hardening temperature reduces the time required to reach peak hardness or strength. Fig. 1 shows the effect of

easy to control, is not critical with respect to time and produces the highest degree of strength or hardness. For high strength alloys this heat treatment requires from 3 hr to $\frac{1}{2}$ hr at temperatures ranging from 600° to 660°F. This type of treatment is generally to be recommended except when special properties are of greater importance than maximum strength or hardness. When large parts are hardened, it will be necessary to use this standard heat treatment to insure uniform heating throughout the section; suggested procedure is 2 hr or more at 600°F.

The short-time, high temperature heat treatment requires from 90 to 15 min at temperatures ranging from 660° to 725°F. Advantages of this heat treatment include (1) better resistance to fatigue and drift, (2) higher conductivity, (3) greater degree of stress-relief for fixture hardening and dimensional control, and (4) considerable saving in heat-treating time.

High-temperature hardening also gives the greatest degree of relief from the internal stresses induced by cold work. The elimination of internal stresses increases resistance to fa-

By JOHN T. RICHARDS

*Design Engineer,
The Beryllium Corp.,
Reading, Pa.*

time and temperature on strength and electrical conductivity, while fig. 2 illustrates the reduction in hardening time caused by cold work introduced at the mill or during forming operations.

Heat-treatable beryllium-copper is readily adaptable to either of two types of hardening heat treatment now in general use; standard low temperature, or short-time, high temperature.

Standard low temperature heat treatment is



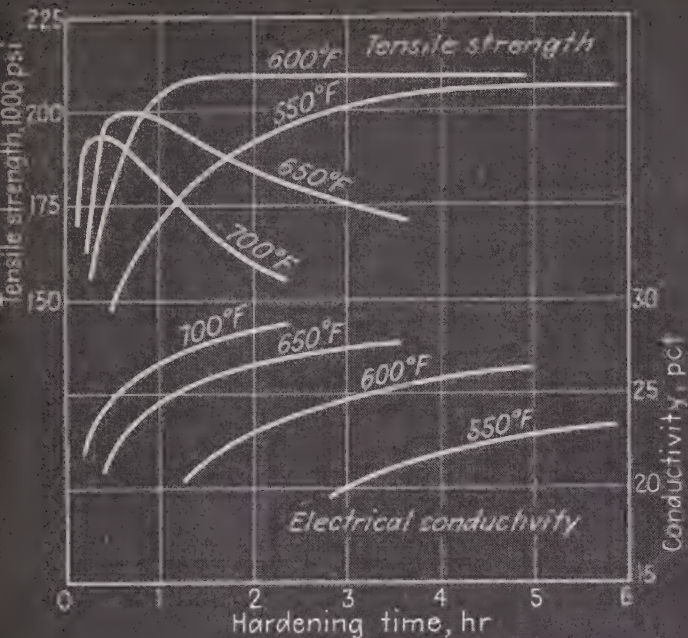


FIG. 1—Typical tensile and conductivity curves for high-strength beryllium-copper cold rolled 4 B&S numbers hard prior to the hardening heat treatment.

tigue and improves stability and conformity. Stability is the resistance to drift and relaxation, while conformity means the ability to assume and maintain shapes induced by fixtures. Since peak hardness for a given temperature is attained before maximum stress-relief, an overaging heat treatment is generally used to obtain these special properties (overaging means heat hardening beyond time required for peak strength). Actual time at temperature selected will depend upon the combination of properties required for the particular application.

Fixture Hardening

The use of fixtures in stress-relief-hardening beryllium-copper has accounted for outstanding reductions in the cost of springs and small structural parts requiring close dimensional control. Heat treating in a fixture at a time and temperature selected to give a high degree of stress-relief, causes parts to set to the shape induced by the fixture. This means that the dimensional variation in the finished part is limited only by the design and tolerance variation of the fixture itself.

Elimination of springback and warpage makes hand adjustment during assembly unnecessary and may more than compensate for the initial cost of beryllium-copper.

In order to obtain the maximum return on fixture investment, the highest possible production rate and fixture capacity are of importance. The reduction in hardening time made possible by the short-time, high temperature heat treatment, together with the rapid heat transfer offered by a

salt bath as compared with an air furnace, suggests the use of this type of hardening to keep production costs low.

Fixtures made of cold-rolled steel are easier to machine than dies and do not require hardening. Because the forming face dimensions determine size and shape of the finished part, it is necessary that they be closely held. Properly designed fixtures will produce small leaf springs to a flatness tolerance of ± 0.0001 in. and a straightness tolerance of ± 0.005 in., while for parts blanked and formed from strip, angles can be held to $\pm 1^\circ$ and in addition no allowance for springback is required in die design. For best results, fixtures when not in use should be completely covered with oil to prevent rusting and should be degreased before being returned to service.

In a similar way coil springs can be economically manufactured to meet rigid dimensional requirements with the fixture heat-treating method. Cold-drawn beryllium-copper wire is cold wound on steel mandrels on either a lathe or coiling machine. The mandrels serve as fixtures during heat treatment, and the stress-relief-hardening cycle relieves residual stresses induced by coiling so that the springs, after being removed from the mandrels, retain the dimensions to which they were coiled. Because of the uniform results obtained in contrast with other spring materials that springback after being cold wound, dimensional control is maintained without hand adjustment and by inspection of only a small percentage of parts.

Choice of Heat-Treating Facilities

Fully formed beryllium-copper parts may be hardened in a circulating air furnace, a muffle furnace, or a salt bath.

All of these types will give satisfactory results with the standard low-temperature heat treatment; but since the short-time high-temperature heat treatment requires more critical time and temperature control than usually obtainable in a muffle furnace, a forced circulation furnace or salt bath is preferred. Because the heating rate is slower in a muffle furnace, hardening will require a longer time than in an air furnace. A salt bath by giving faster heat transfer requires about 25 pct less total time than a circulating air furnace.

In all cases hardening time is the length of time parts are held at temperature, excluding time required to reach temperature. If parts are

TABLE I
Nominal Composition of Various Beryllium-Copper Alloys

	High Strength		High Conductivity		
	Cu-Be-Co	Cu-Be	Cu-Co-Be	Cu-Co-Ag-Be	Cu-Cr-Be
Beryllium..	2.0	1.7	0.4	0.4	0.1
Cobalt	0.3	0.3	2.6	1.5	...
Silver	...	...	...	1.0	...
Chromium ..	...	...	...	...	0.5
Copper	Balance	Balance	Balance	Balance	Balance

furnace cooled, some reduction in heating time is necessary, while for the high-temperature, short-time heat treatment, quenching the part in cold water is helpful in fixing the end of hardening time.

For best results close control of temperature is important. Not only should the range of temperature variation be small, but heating should be uniform throughout the furnace or bath. A variation of $\pm 10^{\circ}\text{F}$ from the desired operating temperature is allowable when hardening at 600°F , but at higher temperatures this range should be limited to $\pm 5^{\circ}\text{F}$. The thermocouple should be located so that readings will be representative of the charge. If there is considerable temperature variation within the furnace or bath from one point to another, variations in hardening response can be expected. In general, forced circulation furnaces or salt baths will give the most uniform results.

Although salt baths can be used at any temperature in the hardening range of beryllium-copper and offer special advantages for short-time, high-temperature heat treatments and fixture hardening, there are several precautions that should be observed in their use. After hardening in a salt bath, parts should be carefully cleaned to remove all traces of salt. In addition, a bath used for beryllium-copper should be kept free from other materials, such as steel. The chocolate-colored surface film that is formed on parts hardened in a salt bath has no effect upon the physical properties of the part, and, when necessary for appearance, may be readily removed.

Adherence to the following cleaning procedure after salt bath hardening will insure good results; (1) quench in cold water, (2) wash in hot cleaning solution, (3) rinse in hot water, and (4) dry.

After fixture hardening the following steps should be used; (1) quench fixture in cold water, (2) wash fixture in hot cleaning solution, (3)

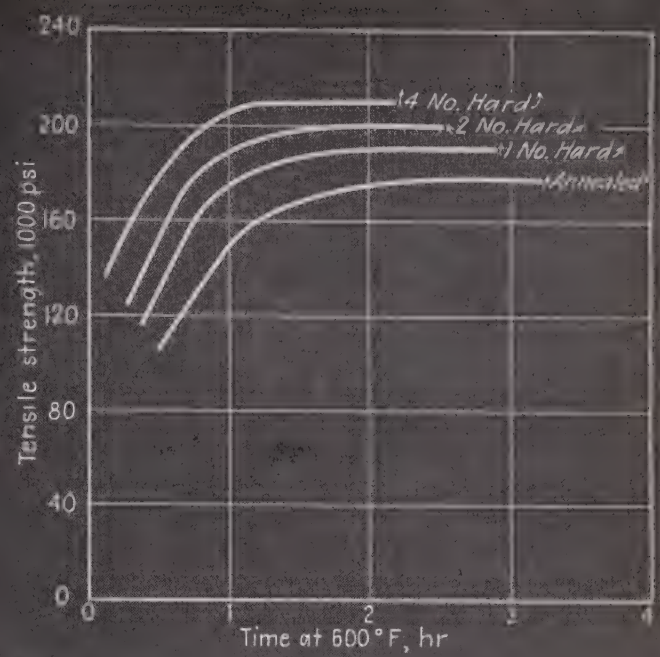


FIG. 2—Effect of temper or cold work upon heat-treating time. Cold work introduced at mill or during forming operations not only increases rate of hardening but also gives higher strength.

rinse fixture in hot water, (4) remove parts from fixture and wash in hot cleaning solution, (5) rinse parts in hot water, (6) dry parts and fixture, and (7) while stored, fixture should be covered with oil.

Controlled or bright atmospheres are generally not necessary in the hardening of beryllium-copper alloys, since the slight discoloration caused by heating in air is in no way detrimental to the properties of the material. For applications requiring a bright finish for appearance or where subsequent welding, brazing or soldering requires a clean surface, the oxide film may be removed by pickling or may be prevented by controlled atmosphere hardening. Suitable atmospheres include hydrogen, cracked ammonia or cracked and sulfur-free natural or city gas. The qualities of the atmosphere selected depend largely upon the surface appearance desired and the equipment used. Any type of furnace may be used in which it is possible to control the atmosphere.

When parts are hardened in air, surface oxides can be removed by pickling as follows:

- (1) Immerse in 15 to 25 pct by volume solution of sulfuric acid and water. Bath should be heated to 135° to 165°F . Parts should be held in solution approximately 10 min or until dark scale disappears.
- (2) Rinse thoroughly in cold water.
- (3) Follow with a bright dip for 15 sec in a cold solution of 15 to 30 pct by volume nitric acid and water.
- (4) Rinse thoroughly in cold water.
- (5) (Optional bright dip for applications re-

TABLE II				
Effect of Heat Treatment on Various Properties of 2 Pct Beryllium-Copper Strip				
	Typical		Minimum	
	Heat-Treatable	Heat-Treated	Heat-Treatable	Heat-Treated
ANNEALED:				
Tensile Strength, Psi...	75,000	175,000		165,000
Elongation, Pct.	35-50	5-8	35.0	5.0
Rockwell Hardness.....	46-65 R	36-41 R		36 R
Conductivity, Pct.	18-20	25-30		
No. 1 HARD:				
Tensile Strength, Psi...	85,000	185,000	73,000	175,000
Elongation, Pct.	20-40	4-6	10.0	3.5
Rockwell Hardness.....	66-85 Rb	38-42 R	66 R	38 R
Conductivity, Pct.	17-18	24-29		
No. 2 HARD:				
Tensile Strength, Psi...	95,000	195,000	80,000	185,000
Elongation, Pct.	6-20	2-4	5.0	2.0
Rockwell Hardness.....	86-93 R	39-43 R	86 R	39 R
Conductivity, Pct.	16-17	23-28		
No. 4 HARD:				
Tensile Strength, Psi...	110,000	205,000	95,000	190,000
Elongation, Pct.	2-5	1-2	2.0	1.0
Rockwell Hardness.....	94-99 Rb	40-45 Rc	94 R	40 R
Conductivity, Pct.	15-16	22-27		

quiring the best surface condition or appearance.) Immerse for 15 sec in a cold solution of 15 volume pct sulfuric acid and water to which is added 4 oz. sodium dichromate to each gallon of solution.

(6) Rinse thoroughly in cold water.

(7) Wash in a hot neutralizing bath of trisodium-phosphate heated to approximately 150°F.

(8) Dry thoroughly by air blast or other available means.

Note: Agitation speeds up process and should be used whenever possible. Steps 1 through 4 and 6 through 8 apply for all pickling procedures, while step 5 should be included only when a bright surface is required.

It is also important that the fabricated parts be both clean and dry before being placed in the furnace for hardening. This will be especially true for material being heat treated in a bright atmosphere, since oil, grease or moisture carried into the furnace will cause an irregular or spotted surface which will detract from the appearance. Oil and grease are readily removed by vaporized solvents such as trichlorethylene or carbon tetrachloride. Alkaline cleaning solutions are satisfactory, but must be followed by a hot water rinse to remove the cleaner, the degree of cleaning depending upon the final surface condition desired.

It is not necessary to remove cadmium plate from parts before hardening, because cadmium is readily vaporized at even the lowest temperatures in the hardening range and will pass off into the atmosphere.

For certain critical applications special combinations of properties, such as increased ductility, electrical conductivity, and resistance to drift, are obtained with special heat treatments as mentioned previously. A typical hardness-response curve, fig. 3, illustrates the effect of time

at temperature upon hardness and electrical conductivity. Similar data can be determined for any desired combination of properties including strength, hardness, conductivity, ductility, stability and conformity.

Heat-Treating Department Requirements

For the plant without heat-treating facilities, whose anticipated production is small, the salt bath offers the cheapest and most versatile installation. An investment of \$100 will cover all needed equipment including a soldering pot for the bath together with necessary tanks for cleaning solution and water rinse.

For a more permanent installation with increased capacity, a salt bath measuring 8 x 8 x 18 in. and requiring 10 kw at 110 v is available for \$375, including thermocouple and line contactor. Commercial salts melting at 275°F, consisting of sodium and potassium nitrate and nitrite mixtures, are generally used. These are relatively stable at temperatures considerably above the melting point. Constant bath temperature is maintained by a proportional type control instrument with a thermocouple suspended in the bath about one-third of the way up from the bottom. Parts are held in the bath by hooks or small baskets suspended from a rack several inches above the pot.

A steel tank to serve as a water rinse should be located as close to the salt bath as possible and will serve not only as a water quench, but will aid in removing salt from the hardened part. This tank should be provided with drain and filling lines to keep the water flowing to prevent contamination of the rinse with salt. To remove the remaining salt from the parts, a neutralizing bath of a commercial cleaner such as sodium phosphate is necessary. This bath also requires a drain to prevent contamination. In addition, a steel table with its top set flush with the tank acts as a working surface. A sliding glass window in front of the salt pot will protect the operator from possible spattering. The total cost of this installation including an automatic timer should not exceed \$600.

For large production work there are a number of possibilities, the furnace used depending to some extent upon existing facilities. A circulating air furnace will frequently handle heavier loading than a salt bath for bulk hardening with the standard heat treatment. Large salt baths or forced convection furnaces generally give best results for special work with short-time, high-temperature treatment, since they provide the required critical control of time and temperature. Because of faster heat transfer, large salt baths are generally used for fixture-hardening applications. In conjunction with production equipment, a small salt bath as described previously will be useful for special and experimental work.

In the use of circulating air furnaces for bulk hardening, the size, power requirements, etc., will depend upon the production rate desired.

Solution Annealing

Since beryllium-copper work hardens rapidly with cold forming, certain operations, such as

TABLE III
Typical Physical Properties for Strip and Rod

	Heat-Treatable		Heat-Treated	
	Annealed	No. 4 Hard	Annealed	No. 4 Hard
Ult. Tensile Strength, Psi...	75,000	110,000	175,000	205,000
Elongation In 2 in., Pct....	35-50	2-10	5-8	1-5
Reduction of Area, Pct....	40-70	25-45	5-15	3-10
Prop. Limit:				
(0.0002% Offset), Psi....	12,000	45,000	60,000	90,000
(0.002% Offset), Psi....	15,000	55,000	75,000	100,000
Elastic Limit:				
(0.0002%), Psi....	15,000	50,000	70,000	100,000
(0.002%), Psi....	17,000	60,000	80,000	110,000
Proof Stress (0.1%), Psi....	30,000	75,000	110,000	140,000
Yield Strength:				
(0.01% Offset), Psi....	20,000	70,000	90,000	115,000
(0.2% Offset), Psi....	30,000	80,000	140,000	170,000
(0.5% Strain), Psi....	35,000	75,000	90,000	95,000
Elastic Modulus in Tension, 10 ⁶ Psi....	1.7	1.7	1.9	1.9
Fatigue Strength (Flat strip in reverse bending), Psi....	33,000	37,000	36,000	42,000
Proportional Limit in Tor- sion, Psi....		50,000		70,000
Shearing Strength, Psi....	80,000	70,000	100,000	115,000
Max. Compressive Strength, Psi....	125,000	.....	205,000	.....
Comp. Stress to Produce Permanent Deforma- tion:				
(0.10% in 1 in.), Psi....	80,000	.....	155,000	.....
(1.00% in 1 in.), Psi....	105,000	.....	200,000	.....
Charpy Impact Strength, Ft-lb....	80	17	7	6

deep drawing, cupping or tube reducing, may require an intermediate anneal to soften the material for further forming. Because beryllium-copper is an age-hardening alloy, close control over time and temperature is necessary when annealing. Although the immediate purpose of the anneal is to soften the material for further forming, it is equally important that the beryllium be placed in solution during the process, so that it is available for hardening when subjected to the aging heat treatment following forming.

The 2 pct beryllium-copper alloy is annealed at temperatures ranging from 1390° to 1475°F, and is held at temperature until the beryllium is in solid solution. Rapid quenching in water from the annealing range preserves this structure at temperatures of reduced solubility, so that the supersaturated condition may be subsequently relieved by the heat-hardening treatment. Relatively small grain sizes give high mechanical properties such as good resistance to fatigue, while large grain sizes offer best formability; so that it is generally necessary to compromise to obtain optimum results.

Although low annealing temperatures can be depended upon to restrict grain size, care should be exercised to insure that most of the beryllium is dissolved. Short times at high temperatures in the annealing range generally give good solubility but with larger grain size. A rule of thumb for grain size in strip up to 0.016 in. thick suggests a size (in millimeters) about three times the strip thickness (in inches), so that the grain in 0.010-in. thick strip should average 0.030 mm.

Any type of furnace covering the temperature range of 1390° to 1475°F is suitable for annealing. Because most salts attack the surface of the metal rather rapidly at these high temperatures, salt baths should not be used for annealing.

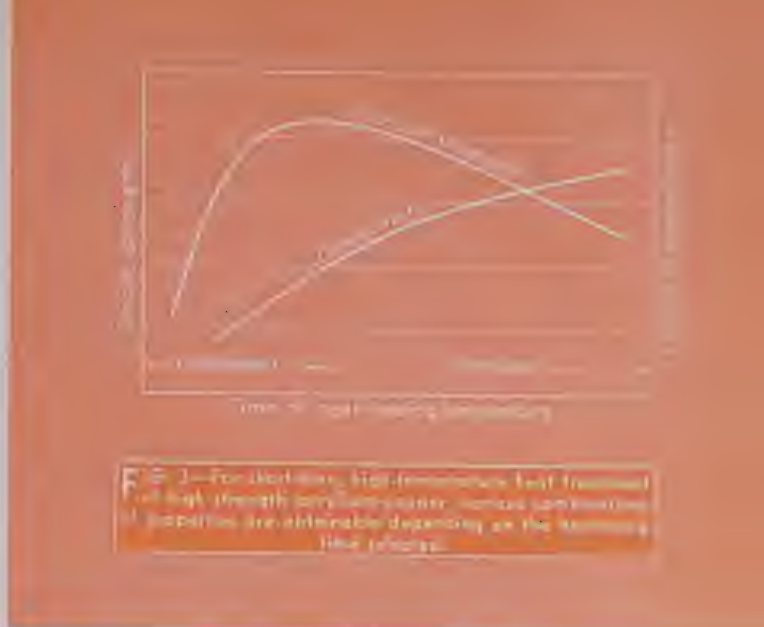
Since heat-treating equipment and conditions vary considerably from one plant to the next, it is not possible to establish annealing times and temperatures that will meet all requirements. The following outline is intended only as a guide or starting point, and it will be necessary for heat-treating departments to determine the best combination of time and temperature for each application.

(1) Charge annealing furnace. Time at temperature (1450°F) values suggested for average conditions are listed for various thicknesses: Up to 0.005 in., 2 to 6 min; 0.005 to 0.010 in., 3 to 9 min; 0.010 to 0.030 in., 6 to 15 min; and 0.030 to 0.090 in., 10 to 30 min.

(2) Quench in water immediately upon removal from furnace.

(3) Test suitable hardness or tensile specimens. A maximum hardness limiting value of 65 RB (82 R15T) generally applies to a tensile strength of about 80,000 psi, while the preferred hardness range of 45 to 55 RB (75 to 79 R15T) indicates average values of 50,000 to 70,000 psi tensile.

(4) Check grain size (optional). The following grain size ranges (ASTM Tentative Method Designation—E2) hold for average conditions: Up to 0.0049 in. material thickness, 0.005 to 0.015 mm; 0.0050 to 0.0079 in., 0.015 to 0.025 mm;



0.0080 to 0.0159 in., 0.025 to 0.045 mm; 0.0160 to 0.0299 in., 0.030 to 0.055 mm; and 0.0300 to 0.0900 in., 0.035 to 0.065 mm.

(5) Harden for 3 hr at 600°F.

(6) Test suitable hardness or tensile specimens. A minimum hardness limiting value of 36 RC (78 R15N) generally applies to a tensile strength of about 165,000 psi, while the typical hardness range of 38 to 41 RC (79 to 81 R15N) indicates average values of 170,000 to 185,000 psi tensile.

For best results it is necessary that parts be free from dirt, oil or grease when placed in the furnace. Parts cadmium-plated for increased die life should be stripped of the plate before annealing. As noted above, the same precaution is not necessary in hardening.

When additional forming operations follow the annealing treatment, it is generally advisable to remove the surface scale. The formation of this oxide film can be prevented by bright annealing in dry and sulfur-free atmospheres of cracked ammonia, hydrogen or cracked city gas having a dew point of at least -40°F.

If facilities are not available for bright annealing, the oxide may be removed by the following pickling procedure:

(1) Immerse in 15 to 25 volume pct solution of sulfuric acid and water. Bath should be heated to 135° to 165°F. Parts should be held in solution approximately 30 min, or until dark scale disappears.

(2) Rinse thoroughly in cold water.

(3) Follow with a bright dip for 30 sec in a cold solution of 15 to 30 volume pct nitric acid and water.

(4) Rinse thoroughly in cold water.

(5) (Optional bright dip for applications requiring the best surface condition or appearance.) Immerse for 30 sec in a cold solution of 15 volume pct sulfuric acid to which is added 4 oz. of sodium dichromate to each gallon of solution.

(6) Rinse thoroughly in cold water.

(7) Wash in a hot neutralizing bath of trisodium-phosphate heated to approximately 150°F.

(8) Dry thoroughly by air blast or other available means.

Note: Agitation speeds up process and should be used whenever possible. Steps 1 through 4 and 6 through 8 apply for all pickling procedures, while step 5 should be included only when a bright surface is required.

If it is not possible to produce a furnace atmosphere having a dew point of -40°F or lower, bright annealing should not be attempted. For ex-

ample, atmospheres having a dew point in the order of 0°F will cause a thin but highly abrasive and tenacious oxide layer to form upon the metal surface. In addition to being difficult to remove by usual pickling procedures, this condition causes excessive die wear. It is preferable therefore to anneal in an uncontrolled atmosphere rather than in one which merely approaches the dew point requirements for brightness. Annealing in an open gas-fired or electric furnace can be expected to cause a black oxide coating, but this may be easily removed by ordinary pickling methods.

Direct Nickel Plating of Zinc Diecasting

DIRECT nickel plating of zinc base diecastings, although not recommended for complex shapes, is reported to give very satisfactory coatings under proper conditions in an article published recently in *Metal Treatment and Drop Forging*, a British quarterly.

Special electrolytes, in which ionization of the nickel sulfate is suppressed by heavy loading with inert sulfates, are required. A typical bath used with success commercially was reported to have the following composition: NiSO₄ crystals, 12 oz per gal; Na₂SO₄ crystals, 32 oz per gal; NH₄Cl, 2 oz per gal; and boric acid, 2 oz per gal. Bath temperature is maintained at 68° to 77°F and at a pH of 5.8 to 6.2 with clean air agitation. Cathode current density is 10 to 15 amps per sq ft. Depolarized and bagged anodes are used. After 0.0002 in. of nickel have been deposited, plating may be completed in an orthodox solution.

The following precautions were emphasized: (1) Work should be loaded into the plating tank with the current on to minimize chemical deposition of nickel; (2) the electrolyte will lack throwing power and should not be used where recesses or shielded areas must be covered; and (3) surface blemishes are likely to give even more trouble than with a copper-nickel cycle.

Recommended plating thickness for mild conditions is 0.0005 to 0.001 in., and for severe conditions, 0.001 to 0.002 in. About 0.00002 in. of chromium subsequently applied improves the durability of the nickel finish considerably.

Elimination of the copper coat would be advantageous in avoiding the stains which occasionally are encountered, but would have the disadvantage of probably necessitating an additional buffing operation.

Where the copper-nickel cycle is to be used, the report warns against too thin copper coatings. Experience has shown that such coatings diffuse into the zinc, leaving the nickel poorly adherent. This difficulty is said not to be encountered when at least 0.0003 in. of copper is applied.

In preparing the diecastings for plating, the procedure recommended is: (1) Trichlorethylene degreasing. (2) Electrolytic cleaning, with

the castings as cathode, in a bath of 4½ oz of Na₃PO₄ and 1½ oz of Na₂SiO₃ per gal of water. Temperature of this bath should be approximately 200°F. A current density of 10 amps per sq ft should be used, with treatment time not exceeding 30 sec. (3) Cold water rinse. (4) Immersion in H₂SO₄ (5 pct by vol) until free gassing occurs, usually about 5 sec.

Rochelle salt-cyanide electrolytes rather than ordinary cyanide copper solutions should be used on zinc to avoid blistering. One bath recommended had the following composition: Cu(CN)₂, 3 oz per gal; NaCN, 4 oz per gal;

New Charts on Arcwelding Electrodes

On the insert folders opposite this page are the new IRON AGE charts of comparable arcwelding electrodes which list the rods by AWS-ASTM and AISI specifications and by company trade name to provide an easy method of determining comparable substitutes for any given rod. Additional copies of these charts are obtainable from the Reader Service Dept., THE IRON AGE, 100 E. 42nd St., New York 17.

Na₂CO₃, 2 oz per gal; Rochelle salt, 8 oz per gal. Conditions for the bath: cathode current density, 30 amps per sq ft; anode current density, not over 20 amps per sq ft; temperature, 122° to 140°F; and pH, 11.6 to 12.2.

Bath composition and conditions recommended for the subsequent nickel plate, following an intermediate dip in cold 5 pct H₂SO₄ and a rinse, were: NiSO₄, 48 oz per gal; NiCl₂, 3 oz per gal; boric acid, 2 oz per gal; pH, 5.6 to 6.0; temperature, 95° to 104°F; cathode current density, 10 to 20 amps per sq ft; and anodes, depolarized and bagged.

Table IV—Stainless Steel Arcwelding Electrodes

Al-Si Grades	Air Reduction Sales Co.	Alloy Rods Co.	All-State Welding Alloys Co.	American Agile Corp.	Arcoa Corp.	Central Steel & Wire Co.	Champion Rivet Co.	Crucible Steel Co. of America	Eutectic Welding Alloys Corp.	General Electric Co.	Harnischfeger Corp.	Hobart Bros.	Hollup Corp.	Lincoln Electric Co.	McKay Co.	Marquette Mfg. Co.	Maurath, Inc.	Metal & Thermit Corp.	Page Steel & Wire	Reid-Avery Co.	A. O. Smith Corp.	Standard Steel & Wire Co.	Universal Welder Corp.	Westinghouse Electric Co.	Wilson Welder & Metals Co.
301					Chromend 16-7																				
302																									
302B								Rezialtal 302 B		W-1308							18-8-B						Stainarc F		
303																									
304																									
307					Chromend 19-8 Mn					W-1307	AW-3C						18-8 Modified		Page-Allegheny 307	Racalloy 307					
308	Airco 19-8 Airco 19-8 (ac-dc)	Arcaaloy 308	All-State 18-8 (ac-dc)	Agile 18-8	Chromend K Stainlend K	Stainkote 308	308	Rezialtal 308	Eutectrode 19-8 (ac-dc)	W-2308	Harstain 18-8 Harstain A 18-8	308	Sureweld 19-8	Stainweld A-7	McKay 18-8	Stain Rod 308	20-10	M & T 308 19-8	Page-Allegheny (18-8) 308	Racalloy 18-8	Smithway SW-162 (dc)	308 G	Stainarc A	308-15, 309-16	L-308 & T-308
309	Airco 19-12 Airco 19-12 (ac-dc)	Arcaaloy 309 and 309 Cb	All-State 25-20 (ac-dc)	Agile 25-12	Chromend HC Stainlend HCN	Stainkote 309	309, 309 Cb	Rezialtal 309, 309 Cb	Eutectrode 25-12 (ac-dc)	W-1309	Harstain 25-12 Harstain A 25-12	309	Sureweld 25-12	Stainweld B	McKay 25-12	Stain Rod 309 Cb	25-12	M & T 309, 25-12	Page-Allegheny (25-12) 309	Racalloy 25-12	Smithway SW-168 (dc)	309 C	Stainarc G	309-15, 309-16	L-309 & T-309
310	Airco 25-20 Airco 25-20 (ac-dc)	Arcaaloy 310, 310 Cb, and 310 Mo	All-State 25-20 (ac-dc)	Agile 25-20	Chromend HCN Stainlend HCN	Stainkote 310	310, 310 Cb, 310 Mo	Rezialtal 310, 310 Cb, 310 Mo	Eutectrode 25-20 (ac-dc)	W-2310	Harstain 25-20 Harstain A 25-20	310	Sureweld 25-20	Stainweld D	McKay 25-20	Stain Rod 310 Cb	25-20	M & T 310, 25-20	Page-Allegheny (25-20) 310	Racalloy 25-20	Smithway SW-167 (dc)	310 G	Stainarc H, 309 Cb	310-15, 310-16	L-310 & T-310
311					Chromend HN												20-25								
312		Arcaaloy 312	All-State 299 (ac-dc)		Chromend 29-9		312	Rezialtal 312	Eutectrode 29/9 (ac-dc)	W-312					McKay 28-9	Stain Rod 312	29-9								
316	Airco 18-8 Mo Airco 18-8 Mo (ac-dc)	Arcaaloy 316 and 316 Cb			Chromend KMo Stainlend KMo	Stainkote 316	316, 316 Cb	Rezialtal 316	Eutectrode 18-8 Mo (ac-dc)	W-2316	Harstain 18-8-2 Mo Harstain A 18-8-2 Mo	316		Stainweld C	McKay 18-8-Mo	Stain Rod 316 Cb	18-8-SMo	M & T 316, 18-8-Mo	Page-Allegheny (18-8-Mo) 316	Racalloy 18-12 (2 to 3 Mo)	Smithway SW-160 (dc)	316 G	Stainarc C	316-15, 316-16	L-316 & T-316
317	Airco 18-8, 3.5 Mo Airco 18-8, 3.5 Mo (ac-dc)	Arcaaloy 317		Agile 18-8 Mo	Chromend 18-8 Mo Stainlend 18-8 Mo		317	Rezialtal 317		W-2317	Harstain 18-8-3 Mo Harstain A 18-8-3 Mo		Sureweld 18-8-Mo			Stain Rod 317		M & T 317, 18-8-Mo (A)	Page-Allegheny (18-8-Mo) 317	Racalloy 18-12 (3 to 4 Mo)	Smithway SW-161 (dc)	317 B	Stainarc D	317-15, 317-16	L-317 & T-317
318								Rezialtal 318																	
325																									
329					Chromend 25-3 Mo												28 Cr-3 1/2 Ni-1 1/2 Mn 15-35								
330	Airco 35Ni-15Cr Airco 35Ni-15Cr (ac-dc)	Arcaaloy 330		Agile 15-35	Chromend 15-35	Stainkote 330	330	Rezialtal 330		W-2330		330	Sureweld 15-35		McKay 15-35	Stain Rod 330			Page-Allegheny (15-35) 330	Racalloy 330					
347	Airco 19-9 Cb Airco 19-9 Cb (ac-dc)	Arcaaloy 347	All-State 199 Cb	Agile 18-8 Cb	Chromend 19-9 Cb Stainlend 19-9 Cb	Stainkote 347	347	Rezialtal 347	Eutectrode 18-8 (ac-dc)	W-2347	Harstain 18-8-Cb Harstain A 18-8-Cb	347	Sureweld 19-9-Cb	Stainweld A6-Cb Stainweld A7-Cb	McKay 18-8-Cb	Stain Rod 347	18-8-SCb	M & T 347, 18-8-Cb	Page-Allegheny (18-8-Cb) 347	Racalloy 18-8-Cb					
403																					Smithway SW-153				
410	Airco 12 Cr	Arcaaloy 410			Chromend 12		410	Rezialtal 410		W-1410					McKay 12-Cr	Stain Rod 410	13 Cr		Page-Allegheny (12 Cr) 410	Racalloy 410					
430	Airco 16 Cr	Arcaaloy 430		Agile 16 Cr	Chromend 16		430	Rezialtal 430		W-1430	Harchrome 16 Cr				McKay 16-Cr	Stain Rod 430	16 Cr		Page-Allegheny (16 Cr) 430	Racalloy 430	Smithway SW-164				
442		Arcaaloy 442			Chromend 18		442	Rezialtal 442							McKay 18 Cr	Stain Rod 442	18 Cr								
446	Airco 28 Cr	Arcaaloy 446			Chromend 28		446	Rezialtal 446		W-1446					McKay 28-Cr	Stain Rod 446	28 Cr		Page-Allegheny (28 Cr) 446						
501					Chromend 2M					W-1602											Smithway SW-151				
502	Airco 4-6 Cr-Mo	Arcaaloy 502		Agile 4-6 Cr	Chromend 5M		502	Lo Cro 502		W-1505	Harchrome 5 Cr		Sureweld 4-6-Cr	Chromeweld 4-6	McKay 5-Cr-Mo	Stain Rod 502	4-6 Cr	M & T 502, 4-6 Cr	Page-Allegheny (4-6 Cr, Mo) 502	Racalloy 502					
Armor Plate		Armor Arc B	All-State 252 (ac-dc)		Chromend HCN Stainlend HCN Chromend 19-9 Mn			Rezialtal 307		W-1307	AW-2B Harstain 25-20 AW-3C				Armaaloy A-5 Armaaloy A-5 Armaaloy C				Page-Allegheny 307 Armor						
		Arcaaloy 308 ELC Arcaaloy 316 ELC Arcaaloy Type 20 Arcaaloy 19-9 WMo																	Page-Allegheny (18-8-Mo) Modified 308T Page-Allegheny (25-20) 310						

* No longer a standard grade.

Table V—Copper Arcwelding Electrodes

ASTM-AWS Symbol	Type of Electrode	Air Reduction Sales Co.	Alloy Rods Co.	All-State Welding Alloys Co.	American Agile Corp.	Ampco Metals, Inc.	Arcoa Corp.	Champion Rivet Co.	Eutectic Welding Alloys Corp.	General Electric Co.	Hobart Bros.	Lincoln Electric Co.	Marquette Mfg. Co.	Metal & Thermit Corp.	C. E. Phillips & Co.	Reid-Avery Co.	Universal Power Co.	Welding Equipment & Supply Co.	Wilson Welder & Metals Co.
E-Cu	Copper				Agile Copper				Eutectrode 300 (dc) Eutectrode 30 (ac)	W-70		Aerweld		PB-57	Crucible Arc 85		Brazarc P	Eureka 52	
E-Cu Sn A	Phosphor Bronze	Airco 70	Cupro Arc	All-State 22, dc		Phosrodes	Bronzend P	Bronze Devil A	Eutectrode 280 (dc) Eutectrode 28 (ac)						Crucible Arc 60		Brazarc P	Eureka Bronze 50 (D)	235
E-Cu Sn C	Phosphor Bronze			All-State 24, dc	Agile Bronze														
E-Cu Ni	Copper Nickel					Nicouend					Softcast A							Eureka 5545	
E-Cu Si	Silicon Bronze	Airco Silicon Bronze			Agile Silicon Bronze	Sil-trodes	Bronzend E		Eutectrode 290 (dc) Eutectrode 29 (ac)				Bronze Rod 61	SB-50			Brazarc S		Silicon Bronze
E-Cu Al-A	Aluminum Bronze	Airco 100				Ampcotrodes 10								AB-12					200
E-Cu Al-B	Aluminum Bronze	Airco 116				Ampcotrodes 160								AB-16					218
E-Cu Al-C	Aluminum Bronze	Airco 120				Ampcotrodes 200								AB-20					220
E-Cu Al-D	Aluminum Bronze	Airco 125				Ampcotrodes 250								AB-25					225
E-Cu Al-E	Aluminum Bronze	Airco 130				Ampcotrodes 300								AB-30					230

Names and Addresses of Arcwelding Electrode Manufacturers (continued)

Lincoln Electric Co.
12816 Coit Rd.
Cleveland 1McKay Co.
1939 Grantly Rd.
York, Pa.Marquette Mfg. Co., Inc.
307 E. Hennepin Ave.
Minneapolis 14Maurath, Inc.
7300 Union Ave.
ClevelandMetal & Thermit Corp.
120 Broadway
New York 5Page Steel & Wire Div.
American Chain & Cable
Co., Inc.
Monesson, Pa.C. E. Phillips & Co.
2750 Poplar St.
Detroit 8Reid-Avery Co., Inc.
Supply Co.
Dundalk, Baltimore 23A. O. Smith Corp.
Milwaukee 1Standard Steel & Wire
Co.
32 Garfield Rd.
Bolivar, Pa.Universal Welder Corp.
735 Carnegie Ave.
Cleveland 18Welding Equipment &
Supply Co.
223 Leff St.
Detroit 7Westinghouse Electric &
Mfg. Co.
P. O. Box 2025
Buffalo 5Wilson Welder & Metals
Co.
60 E. 42nd St.
New York 17

If You Want Additional Copies . . .

of THE IRON AGE charts showing comparable welding electrodes, they are available in pamphlet form at 25¢ a copy. For extra copies, write THE IRON AGE, Readers Service, 100 East 42nd Street, New York 17.

Magnesium Treatment for Nodular Graphite Cast Iron

Stressing primarily the processing phase of nodular graphite cast iron, this article indicates the influence of various magnesium-containing additions on physical properties. Precautions to be observed by the foundryman in conducting the magnesium treatment are also discussed from the standpoint of safety and optimum properties.

o o o

GRAY cast iron has been produced in which the free carbon or graphite particles are in a nearly spherical form instead of in the familiar flake form. This structural change brings about a substantial increase in the strength, ductility and toughness of the iron as cast.

The production of nodular graphite cast iron, as revealed by Morrogh¹ involves treatment of molten cast iron in the ladle with cerium metal or alloy thereof. The cerium treatment is most effective in high carbon, low phosphorus and low sulfur cast irons. In experiments carried out at the American Cast Iron Pipe Co., the English results using cerium were immediately confirmed,

and subsequently tests with magnesium additions² were carried on.

Nodular graphite cast iron can be produced by adding pure stick magnesium on the surface of iron in the ladle. Magnesium volatilizes at

¹ "Production of Nodular Structure in Cast Iron," by H. Morrogh, presented at the May, 1948, annual meeting of the American Foundrymen's Society; also THE IRON AGE, May 20, 1948, p. 82.

² Ed. Note: A descriptive article entitled "Ductile Cast Iron—A New Engineering Material," authored by A. P. Gagnebin, K. D. Millis and N. B. Pilling, of the International Nickel Co., Inc., Bayonne, N. J., was published in THE IRON AGE, Feb. 17, 1949, p. 76.

2030°F, however, and burns explosively in air, so that only about 5 pct of the magnesium added is normally retained in the metal. A search of magnesium alloys was undertaken to develop a method of obtaining higher and more consistent recovery of magnesium and less violence of reaction during addition.

Table I shows results obtained with several alloys added to the high carbon type of iron favored for the cerium treatment. Tensile test specimens for each cast were machined from 1 in. diam sand-cast bars, and spectrographic analy-

TABLE I
Effect of Adding Magnesium Alloys to High Carbon Cast Irons¹

Ladle No.	Total C, Pct	Si, ² Pct	Mg Alloy	Magnesium, Pct			Tensile Strength, 1000 Psi	Bhn
				Added	Anal.	Recov.		
1	4.18	1.58	Airplane scrap (90 pct Mg)	None	.....	.....	20.1	126
2	4.16	1.78	Airplane scrap (90 pct Mg)	0.60	.....	About 6	50.9	174
3	4.14	2.02	Airplane scrap (90 pct Mg)	0.75	.....	About 6	104.3	229
1	4.05	2.33	50-50 Ni-Mg	0.25	0.025	10	12.5	111
2	4.18	2.21	50-50 Ni-Mg	0.38	0.028	8	19.7	103
3	4.13	2.61	50-50 Ni-Mg	0.50	0.029	6	28.0	80
4	4.06	2.39	50-50 Ni-Mg	0.63	0.045	7	95.1	223
1	3.57	2.20	50-50 Cu-Mg	0.60	0.053	9	113.0	255
1	3.62	2.61	70-30 Cu-Mg	0.26	0.029	11	42.2	192
2	3.62	2.61	70-30 Cu-Mg	0.40	0.068	17	117.8	265
1	3.71	1.87	80-20 Cu-Mg	0.20	0.024	12	22.7	103
2	3.71	1.87	80-20 Cu-Mg	0.30	0.035	12	119.0	255
3	.....	.....	80-20 Cu-Mg	0.40	0.065	16	104.7	283
1	3.44	2.19	82-18 Cu-Ni	0.22	0.058	26	124.1	285
2	3.44	2.19	82-18 Cu-Ni	0.30	0.085	28	116.0	277
3	3.44	2.19	82-18 Cu-Ni	0.42	0.084	22	106.0	285

¹ 0.05 pct S max; 0.50 to 0.80 pct Mn; 0.16 pct P max.

² 0.40 pct Si as 75 pct ferrosilicon added to each ladle after magnesium treatment.

TABLE II
Effect of Lowered Carbon Content

Ladle No.	Analysis, Pct				P	Magnesium, Pct			Tensile Strength, 1000 Psi	Bhn
	Total C	Si	S	Mn		Added*	Anal.	Recov.		
1	3.85	2.70	0.02	0.65	0.10	0.75	0.048	6½	92.0	212
2	3.72	2.70	0.02	0.65	0.10	0.75	0.045	6	90.5	217
3	3.48	2.70	0.02	0.65	0.10	0.75	0.060	8	85.4	223
4	3.15	2.70	0.02	0.65	0.10	0.75	0.049	6½	98.7	229

* Magnesium added to each ladle as magnesium airplane scrap containing some aluminum and zinc. In each case the magnesium addition was followed by an addition of 0.40 pct Si as ferrosilicon.

sis for magnesium content was made for most of the heats. Note that in each heat as the magnesium addition is increased, there is a sharp increase in strength, which indicates when the graphite has assumed the nodular form. About 0.04 pct or more of magnesium in the iron is required to produce the full effect.

Recovery of magnesium increases as the alloy becomes more dilute in magnesium. For example, in table I, 0.75 pct Mg scrap was required, while only 0.30 pct Mg addition in the form of the 80 pct copper alloy gave a very high strength iron in which the graphite was completely nodular.

As regards explosiveness and reactivity during addition, the magnesium alloy scrap and the 50 pct alloys of magnesium with nickel and copper were found to be about as violent as pure magnesium. The more dilute magnesium alloys are much less violent, and with 30 pct or less of magnesium, alloys with either copper or nickel are usable within the foundry with some simple precautions for protection of personnel and adjacent flammable structures.

Two general methods of treating molten iron with magnesium, which may be applicable in production are: (1) use of an alloy dilute enough in magnesium that the reaction is not violent, or (2) use of suitable protective equipment so that relatively pure magnesium can be added without danger.

In addition to the high cost of cerium metal, the disadvantages of the cerium process are the restrictions of base iron composition to which the process is applicable. Magnesium treatment is effective in a wider range of base iron compositions.

Table II shows results of an experimental heat

in which carbon content was progressively lowered by successive additions of steel scrap while the balance of the composition was held approximately constant. Even when the carbon content was lowered to 3.15 pct the tensile strength was maintained and the graphite form was still nodular.

Sulfur content affects both the cerium and magnesium treatment, since both elements combine with sulfur very readily; however, by adding a slight excess of magnesium no difficulty has been experienced in producing nodular irons

This article represents an extended abstract of a paper entitled "Magnesium Treatment of Nodular Graphite Cast Iron," presented by C. K. Donoho, chief metallurgist, American Cast Iron Pipe Co., Birmingham, at the regional foundry conference held in Birmingham, Feb. 17, 1949.—Ed.

from cupola metal containing as much as 0.09 pct S, as melted. Phosphorus reduces the solubility of cerium to the extent that over 0.50 pct P renders the cerium treatment ineffective. Nodular graphite has been produced by magnesium treatment of irons with up to 0.70 pct P.

As noted in table I and II, an inoculating addition of ferrosilicon is made to the ladle after the magnesium treatment. Except in the very soft high carbon irons, omission of the ferrosilicon addition will cause mottled iron and hard spots. Also, if an excessive amount of magnesium is incorporated in the metal the iron becomes harder and more brittle.

Magnesium treatment for nodular graphite cast iron can be carried out in any reasonably well-equipped gray iron foundry. The low magnesium alloys can be added to the ladle within the foundry, or with a covered ladle and suitable protection, pure magnesium or magnesium scrap can be used. The magnesium treatment is preferably followed by addition of a graphitizing inoculant such as ferrosilicon. Since different base irons may require different magnesium additions it is recommended that trial casts be made with varying percentages of magnesium added to separate ladles of the same base iron to establish the optimum addition. Magnesium alloys and information on handling of magnesium are available from Dow Chemical Co., Midland, Mich.

Table III shows the effect of section size on a low carbon iron treated with magnesium alloy. Transverse test results are expressed as modulus of rupture and the "secant" modulus of elasticity,

TABLE III
Effect of Section Size—Cast R.N. 2748

Test Bar Diam, In.	Transverse Tests			Bhn
	MR 1000 Psi	ME 1,000,000 Psi	Tensile Strength, 1000 Psi	
0.6	185.8	7.5	99.5	254
0.875	155.0	7.5	92.0	235
1.20	147.4	6.8	80.3	229
2.00	135.0	6.0	77.5	201
3.00	128.1	6.0	76.5	201

Analysis: Total C, 3.08; Si, 3.26; S, 0.019; Mn, 0.44; P, 0.02.
Added to ladle—0.56 pct Mg as Ni-Mg (50-50 alloy) and 0.40 pct Si.

TABLE IV
Keel Block Tests of Magnesium Treated Irons¹

Test No.	As Cast					Annealed				
	T. S., 1000 Psi	Y. S., 1000 Psi	Elong., Pct	R. A., Pct	Bhn	T. S., 1000 Psi	Y. S., 1000 Psi	Elong., Pct	R. A., Pct	Bhn
1	92.0	60 ²	9.4	7.5	180	70.2	46.1	21.5	19.6	152
	93.5	60 ²	8.1	6.5	186	69.9	45.8	17.8	18.1	141
2	82.5	49.2	11.2	9.8	170	69.6	45.1	20.4	19.6	143
	78.5	55.0	3.8	1.5	170	63.5	51.6	11.5	4.0	152
3	78.8	....	3.8	3.5	187	64.1	54.0	8.9	7.0	156
	102.5	....	9.0	7.5	207	77.0	54.0	20.3	23.5	170
4	101.0	62.6	6.7	5.5	212	76.0	54.3	18.6	23.2	163
	104.3	66.9	4.3	3.4	241	77.2	54.2	16.5	14.0	170
5	105.3	....	4.8	4.0	229	75.9	54.2	14.9	12.7	163

Test No.	Furnace	Ladle Additions, Pct	Analysis, Pct						
			Total C	Si	S	Mn	P	Mg	Other
1	Crucible	1.0 pure stick Mg 0.40 Si	3.70	2.58	0.028	0.41	0.040	Not det.	
2	Induction	0.75 Mg scrap 0.40 Si	3.51	2.13	0.040	0.61	0.10	Not det.	
3	Arc	0.44 Mg as Ni-Mg 0.40 Si	3.42	2.81	0.031	0.60	0.027	0.039	Ni 0.34
4	Arc	0.56 Mg as Ni-Mg 0.40 Si	3.48	2.74	0.032	0.58	0.029	0.050	Ni 0.40
5	Arc	0.625 Mg as Ni-Mg 0.40 Si	3.50	2.59	0.028	0.53	0.10	0.080	Ni 0.60

¹ Tensile tests—0.505 in. diam bar—2 in. gage length.

² Approximate.

a measure of stiffness. As section increases from 0.6 in. to 3 in. diam, hardness and strength decrease uniformly although not to as great an extent as would be expected in flake graphite irons.

Some tests were made on magnesium-treated irons cast into the keel block type of molds used for obtaining test specimens of cast steel. Standard 0.505-in. diam, 2-in. gage length, steel-type tensile bars were machined from the legs of the keel blocks. Table IV shows the results of typical tests both in the as-cast condition and after a 1650°F, 1-hr, anneal. Note that some of the annealed properties obtained are higher than

those usually quoted for malleable irons and are almost comparable to cast steel properties.

While the tests reported indicate the possibilities of magnesium-treated nodular graphite cast irons, a great deal of development work remains to be done: (1) The most practical methods of introducing magnesium should be established; (2) heat treatments of nodular irons should be studied further; (3) effect of other alloys in conjunction with magnesium should be evaluated; and (4) determination of applicability in various wear and corrosion services should be made for nodular graphite cast irons.

... NEW BOOKS ...

"FIAT Review of German Science, Allied Edition." Thirty-two volumes of a projected 84-volume series have been made available. Object of the series is to acquaint scientists and technical workers with German work and developments for the years 1939-45. Among the subjects covered are nonferrous metallurgy, pure mathematics, the physics of solids and chemistry. Office of Technical Services, Dept. of Commerce, Washington 25. Printed copies, \$3.00 each.

* * *

"Manual of Die-Head Thread Cutting," by H. Schlarman. Manual explains the basic principles of producing threads with dieheads, and

describes the causes, effects and corrective measures for common troubles in threading with self-opening dieheads. Thread-producing equipment and methods, unusual applications, maintenance, gaging and many other phases of the subject are covered. McGraw-Hill Book Co., 330 W. 42nd St., New York. \$3.50. 266 p.

* * *

"Handbook of Industrial Hazards from Explosive Dusts," by W. H. Geck. Two-volume study analyzes the nature and composition of dust, its origin and its ignition. The flour, coal and aluminum industries are the only ones not covered. Protective measures for decreasing dust hazards are described. Office of Technical Services, Dept. of Commerce, Washington 25. Both volumes, \$7.25. 272 p.

Chromizing with Chromium Chloride

A METHOD of diffusing chromium into the surface of steel, said to eliminate the unfavorable characteristics obtained with chromium plating and the disadvantages of high temperatures and long heating times associated with powdered chromium methods, and referred to as the "Inkrom" or "BDS" process, is described in the *Iron and Coal Trades Review*, Jan. 14, 1949 (taken from the Swiss journal, *Technische Rundschau*).

In contrast with the high temperature difficulties resulting from the use of powdered chromium, it has been found possible to obtain acceptable diffusion zones with the employment of liquid or gaseous chromium compounds. As basic material for this process use was made of the halides of chromium, particularly of chromium chloride.

Initial laboratory tests consisted of directing a stream of hydrogen and hydrogen chloride over red-hot ferrochrome, producing chromium chloride compound. This compound was then made to react with a steel surface, at a temperature of about 1830°F, and a diffusion zone of from 0.004 in. to 0.020 in. was built up, containing over 30 pct Cr on the surface.

The laboratory process was not an economical proposition and means had to be estab-

lished to develop a stabilizing process for the production of chromium chloride. This was achieved by developing a ceramic body which could be charged with chromium chloride, thus providing an active body for repeated use in the diffusion process.

Steel specimens to be treated are packed in these active ceramic forms, charged into a furnace and heated. The proper choice of the type of steel is important since high carbon steel gives unfavorable diffusion zones. Special steels ("IK" steels) are said to be under development for the process. These are mild unalloyed steels with tensile strengths between 42,660 to 56,880 psi. The steels can be welded or soldered; the former is carried out before chromium diffusion treatment and the latter after diffusion.

The diffusion treated steels are claimed to be equal, in surface corrosion resistance, to a 30 pct Cr alloy steel. Cold forming, pressing and drawing can be performed without detrimental effect to the protective qualities of this surface. The treated surfaces are said to be resistant to scaling to 1560°F for long periods and at higher temperatures for shorter periods. Forgings and steel castings can also be treated with this process.

Hot Tearing of Aluminum Castings

AN INVESTIGATION involving a quantitative test for hot tearing of aluminum alloy castings is described in *Metallurgia*, January 1949 (taken from Bull. Acad. Sci., USSR). The test was carried out for the purpose of determining the resistance to cracking during the recrystallization period of cast specimens of aluminum-copper alloys containing 0 to 12 pct copper and of aluminum-silicon alloys containing 0 to 4 pct silicon.

The test method involved the use of a mold having one of its two ends movable. As shrinkage stresses caused the casting to contract, it was forced to lift a weight attached to the movable end. The weight was varied to determine the resistance to shrinkage stresses of a given alloy.

Aluminum of 99.98 pct purity was found to have a critical stress of 82.5 psi and for various percentages of copper in aluminum, the critical stresses were as follows:

Pct Cu	Critical Stress, Psi
1	36.4
2	2.8
3	11.2
5	16.8
8	25.2
10	114.8
12	168

For various percentages of silicon in aluminum, the critical stresses were as follows:

Pct Si	Critical Stress, Psi
0.1	64.3
0.2	30.8
0.3	2.8
0.5	2.8
1	2.8
1.5	8.4
2	8.4
2.5	36.4
3	137
4	168

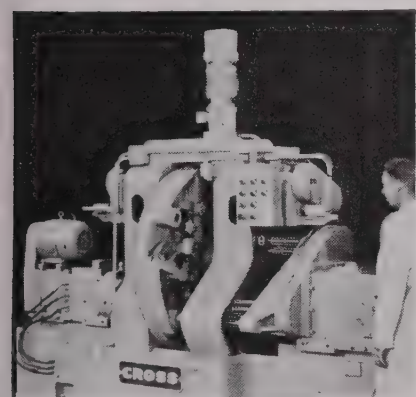
Qualitative tests showed that the 0.5 pct silicon alloy has the lowest value of critical stresses.

These results were explained on the basis that the tendency to hot tearing increases proportionately as the "effective temperature interval" of crystallization up to the concentration at which eutectic forms on non-equilibrium cooling. It is suggested that small quantities of eutectic heal cracks that form in the early part of the cooling process, and therefore hot tearing decreases fairly rapidly with the appearance of eutectic.

New Production Ideas . . .

A gage for simultaneously checking six piston dimensions, a contour milling machine, grinding attachments, gusher and air driven pumps, a micro-hardness tester and a pocket size Brinell hardness reader, a spot welding torch, and a hydraulic weighing cell for measuring tension loads and compression are new and improved methods and equipment featured this week.

A NEW special drilling machine finishes automobile dual carburetor intake manifolds, except for milling. Operations include drilling, reaming, and tapping, and



production is rated at 155 pieces per hr. The equipment has a five station power index trunnion with an independent station for loading and unloading while the machine is operating. Four pieces are cut at a time progressively. Other features include fluid drive index with overload protection for safety, hydraulic feed for drilling and reaming, lead screw feed for tapping, hardened and ground steel ways. *Cross Co. For more information, check No. 1 on the attached postcard.*

Piston Gage

A SPECIALLY designed multiple station piston gage checks six dimensions simultaneously, stamps two grades, and automatically shows the number of pistons of each grade inspected. This gage uses P&W Electrolimit and multiple electric contact gaging mediums. When the inspector pushes the piston into gaging position, the gage is in operation. The meter at the left indicates the

grade of pinhole diameter and operates the second row of lights at the top of the gage. The meter at the right indicates the skirt diameter grade and operates the top row of lights. The width of the ring grooves is checked by the red light meaning oversize and the green light meaning undersize. When neither light is on, the ring groove width is within size. The piston is automatically marked on top with the grades of the skirt

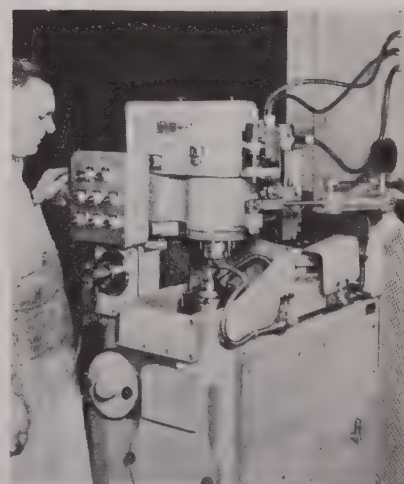


and pinhole diameters. *Pratt & Whitney. For more information, check No. 2 on the attached postcard.*

Contour Milling Machine

A NEW cam-controlled contour milling machine combines in one machine a vertical spindle milling head, a cam follower, a cam-carrying table and a rotary work table and is designed for milling irregular contours on work parts from master cams. The machine features a wide selection of automatic cycles for both internal and external milling of almost any contour on work parts up to 5 in.

diam. The small, compact design permits line installation of a group of machines for one-man operation of unloading, reloading and starting the automatic machine cycle. A $\frac{3}{4}$ hp milling head and a cam follower spindle are mounted together on a swinging arm. The ratio between the cam roller arm and the cutter arm is 2:1, reducing any cam error $\frac{1}{2}$ on the finished part. The cutter spindle is driven by V belt from a $\frac{3}{4}$ hp variable speed motor, producing the infinitely adjustable speeds ranging from 425 to 4150 rpm. The cutter spindle is mounted in a head having $3\frac{1}{4}$ to 8 in. vertical adjustment from top of rotary table to spindle nose. Total spindle quill movement is $1\frac{1}{4}$ in. The 6-in. rotary table and the cam-carrying spindle are both worm

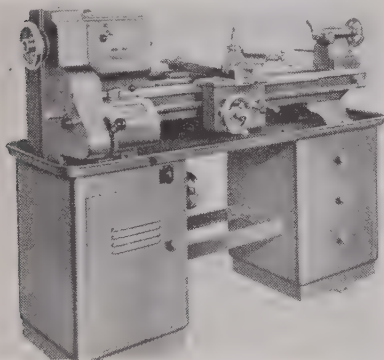


driven off the same motor at 1:1 ratio: *Sundstrand Machine Tool Co. For more information, check No. 3 on the attached postcard.*

Precision Lathes

THE new Series 200 precision lathes feature both headstock and gear box enclosed and running in oil; the A.S.A. size L-00 spindle

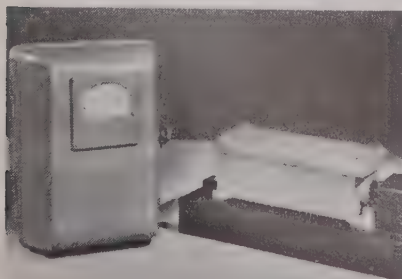
is forged, hardened and ground, rotating on its own Timken tapered roller bearings. The enclosed motor drive provides infinite spindle speeds and the spindle to back gear engage-disengage and double drive belts are easily and quickly removed. Additional features are the quick change enclosed type gear box con-



trols and simplified single lever longitudinal and cross feed control. The Series 200 has 1 in. collet capacity, 1 3/8 in. bore through spindle, 12 3/4 in. swing over bed, 7 3/8 in. swing over carriage. V and flat ways are ground to within 0.001 in. of parallelism. *Clausing Mfg. Co. For more information, check No. 4 on the attached postcard.*

Magnetic Strain Gage

DIRECT measurement of small distortions in a static member resulting from a tensile or compressive load is possible with a new magnetic strain gage. It is useful as a warning to the operator when a crane is in danger of upsetting from overloading, or on other metal structures where variations in load may approach safe limits of the supporting member. The unit consists of the strain gage enclosed in a water-tight case and pilot bar sensitive to a force as



small as 20 lb and a controller with indicating dial located wherever desired, near the operator. Operation is from a single phase 110 v, 60 cycle supply. Power required is

35 volt-amp. *Westinghouse Electric Corp. For more information, check No. 5 on the attached postcard.*

Vertical Cutoff Machine

A VERTICAL cutoff machine with an 18x18 in. capacity cuts out sections from plates. Vertical cutting permits closer adjustment of saw guides and facilities placing material into the machine. The base and frame are formed and welded heavy gage steel, with box type construction providing strength and rigidity. The frame on which two 18-in. diam saw wheels are mounted travels on roll-



ers and the cutting cycle is completely automatic. There are two graduated scales, one showing the required inches of cutting, and the second for adjustment of the cutting length. The electrically controlled work feed pressure is adjustable from zero to 100 lb. The saw blade used is 3/4 in. wide x 162 in. long. A 1 hp motor is used for the five-speed saw blade drive, a separate 1/3 hp for the automatic work feed. *Grob Bros. For more information, check No. 6 on the attached postcard.*

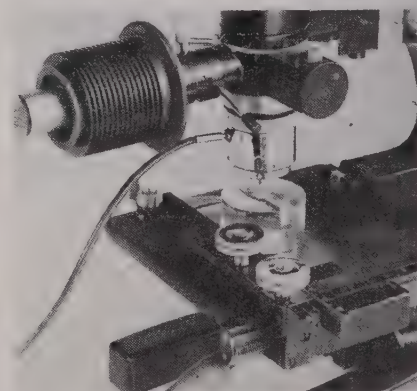
Band Saw

INTRICATE cuts can be made cleanly and easily in steel, plastic and foam rubber with a new power band saw with spiral blade. The band saw will cut freely in any direction, enabling the operator to cut any pattern without turning the work. It can saw to the center of material 24 in. wide and of infinite lengths. An automatic adjustment dial sets the proper speed for each of the various materials. A hardened blade, 81 Rc, is recommended for cutting metal. The

band saw measures 60 in. high, with a 12 in. throat and 8 1/2 in. clearance under guide. Table tilt is 45° right, 5° left. The saw is powered by a 1/3 hp heavy duty, 110 v electric motor. *Tyler Mfg. Co. For more information, check No. 7 on the attached postcard.*

Micro-Hardness Tester

MEASURING hardness of micro-constituents, fine wire, metallic foils, electrodeposited coatings, minerals and organic substances is possible with a new micro-hardness indenter that features adaptability to conventional table microscopes, versatility, simplicity of operation, and low cost. The focusing mechanism of the microscope is used to effect indentations by the Vickers diamond penetrator that is mounted interchangeably with the microscope objective. Resulting impressions are measured optically and values obtained are in terms of standard



Vickers hardness. The unit is provided with 25 and 50 gram dead-weight loading, low-friction jewel bearings, and indicating assembly. Hardness conversion charts are furnished with the instrument. *Erb & Gray. For more information, check No. 8 on the attached postcard.*

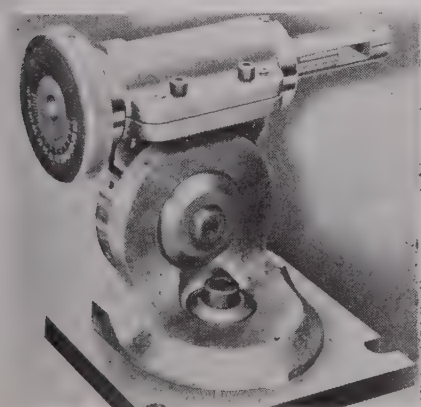
All-Aluminum Precipitron

DEVELOPMENT of an all-aluminum model of the industrial Precipitron can handle 10 pct greater volume of air than previous units of the same size. There are 99 plates in the new model having 3 in. additional length in each plate, providing 17 pct more dirt-trapping area. The Precipitron is built in two sizes: 36 and 24 in. wide, the larger unit cleaning 1000 cu ft of air per min, the smaller one 667 cu ft. Installed in con-

junction with ventilating systems, the cells are stacked in tiers according to air cleaning needs. *Westinghouse Electric Corp.* For more information, check No. 9 on the attached postcard.

Grinding Fixture

GRINDING cutting edges, steps, flutes and chip relief on Madison roughing and reaming cutters, milling cutters, chamfering tools, turning tools and reamers, and a variety of run-of-the-shop grinding jobs are facilitated with a newly designed grinding fixture. The fixture is graduated in degrees in all three planes. It offers automatic indexing for Madison tools and any other where 180° indexing is required. This automatic index feature can be released for conventional handling of other types of tools. Arbors for all sizes of Madison cutters, for single point



tools, and for milling cutters are available. *Madison Mfg. Co.* For more information, check No. 10 on the attached postcard.

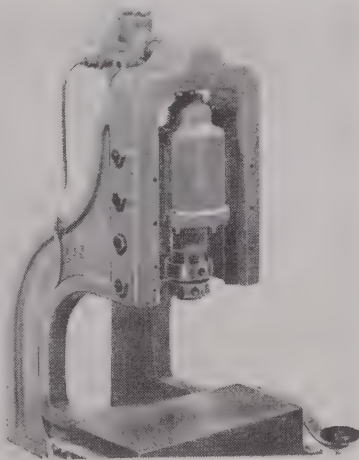
Finishing Machine

A NEW eight-door machine for finishing parts whose size and shape are not adapted to standard Roto-Finish processing methods has been announced. Built as special equipment for individual requirements, the new machine is similar to the standard one compartment Roto-Finish machine, except that each flat of the octagonal tank is fitted with a large door. Parts are rigidly fixtured to the back of each door, so that surfaces to be finished are presented to the processing mass. Selective action caused by one-direction processing is overcome by reversing cylinder rotation. Doors and fixture plates are interchangeable to handle a

multiple of different parts, all of which may be processed at one time. A magnetic brake and forward and reversing switches are supplied with each machine. *Sturgis Products Co.* For more information, check No. 11 on the attached postcard.

Pneumatic Presses

USING simple dies and tools, three pneumatic presses deliver 400, 1200, and 2000 lb pressure on the anvil using 100 lb line pressure. A line regulator insures the required amount of air pres-



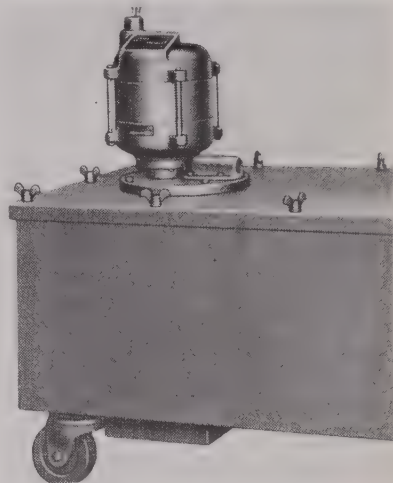
sure to give a perfect and efficient job. A control valve on the top of the cylinder provides a cushioning effect on the work. Two hand air valves are connected to insure safety. The press will not operate with one alone. An air cushion cylinder is built into the large cylinder with a control valve to control the air escape. This feature can change the cylinder action from a hard blow to a squeeze action. *Clayton Mfg. Co.* For more information, check No. 12 on the attached postcard.

Brinell Hardness Reader

BRINELL hardness numbers can be read directly from the Brinell impression in a few seconds with a pocket size Brinell reader. The reader is self-centering and involves no conversion tables, estimation, parallax or eye strain. There are two calibrations available: No. 4400-3000 for the 3000 kg load and 10 mm ball; No. 4400-500 for the 500 kg load and 10 mm ball. *Harry W. Dietert Co.* For more information, check No. 13 on the attached postcard.

Gusher Pumps

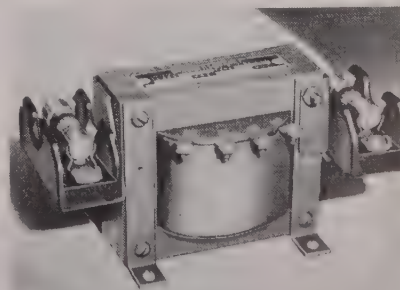
AN explosion proof polyphase motor in sizes 1/4, 1/2 and 3/4 hp has been developed for any gusher pump within this horsepower range. These motors are suitable for use in hazardous locations and have passed the Underwriters' Laboratory test Class I,



Group D. The pump illustrated is installed on a totally enclosed portable tank and has a 1/4 hp explosion proof motor. Gusher pumps handle many liquids up to 150 ssu at 100°F and are not limited to any one field. This product has a one piece heavy ground vertical shaft that rotates on large pre-lubricated precision sealed ball bearings. High accuracy of dynamic balance is obtained by electronic process. *Ruthman Machinery Co.* For more information, check No. 14 on the attached postcard.

Control Transformers

A NEW line of control transformers has been designed for use with industrial control equip-



ment that is characterized by high, momentary inrush currents to the ac operating magnet coils. The manufacturer claims the low impedance values of the transformer

windings result in unusually good transformer regulation during peak current periods. One or two fuses provide secondary circuit protection, and bracket assembly units can be easily mounted directly on the transformer. The units are compact, easy to mount, and built for front-wired control panel use. Accessible, screw type terminals permit panel wires to run directly to the transformer. Transformers are available in 50, 100, 150, 300 volt-amp at either 50/60 or 25 cycles, and 500 volt-amp at 50/60 cycles, with primary voltages of 220-440, 550, 440, 380, and 220, and secondary voltages of 110 or 24 v. *Square D Co. For more information, check No. 15 on the attached postcard.*

Spot Welding Torch

A NEW portable, inert-gas-shielded spot welding torch, called the Heliarc HW-8, can make spot welds from only one side of the work without the necessity of backing the weld location. Mild steel, low alloy and stainless steel, 0.030 to 0.064 in. thick can be welded

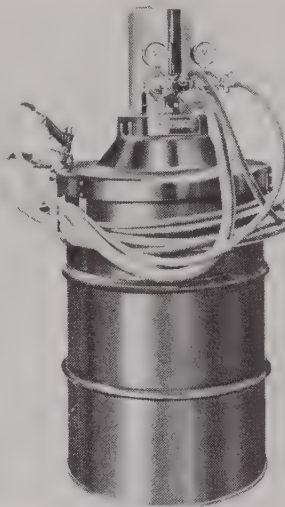


using currents from 155 to 250 amp. Two sheets of these metals can be joined in 1 to 2 sec per spot, and a sheet of metal can be joined to underlying material of any thickness. This makes it possible to spot weld corrosion-resistant sheets to mild steel to provide cladding. Argon gas shields the electrode and weld area to prevent oxidation. Welding duration and argon flow are controlled by a separate timer unit. This torch uses ac or dc with high frequency starting and stabilization of the arc. *Linde Air Products Co. For more information, check No. 16 on the attached postcard.*

Underbody Coating Pump

A LIGHTWEIGHT air-driven pump attaches quickly and easily to any standard 55-gal ship-

ping drum, the common container for underbody coatings. Dual pistons give surge-free delivery at a rate up to 5½ gpm, and the material is carried directly to the spray gun through a standard ¾ in. hose.



Materials of light or heavy viscosity can be handled with equal ease and is delivered to the spray gun at 4 times the applied air pressure, assuring fast, even flow. A standard two-regulator control permits precise regulation of both material and atomizing pressure. Binks 7E1 spray gun, designed for application of heavy coatings, is recommended for use with this unit. *Binks Mfg. Co. For more information, check No. 17 on the attached postcard.*

Flame Spray Pistol

A SMALL flame spray pistol has been developed for use in laboratories where grams or ounces of powder may be sprayed instead of



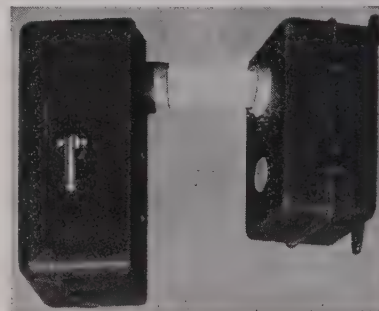
pounds. It will spray any metal or plastic powder or mixtures of metal and plastic powders. The pistol can be used for heating, brazing, and soldering in addition to spraying. *Schori Process Div. Ferro-Co Corp. For more information, check No. 18 on the attached postcard.*

Power Pipe Threader

A PORTABLE powered pipe threader is operated by any ½-in. standard electric drill and threads 1, 1¼, 1½, or 2-in. pipe with one set of high speed thread chasers. The tool weighs 26 lb and one man can carry it with ease. The threader is furnished complete with one set of high speed steel chasers and a drive adapter. *Armstrong Bros. Tool Co. For more information, check No. 19 on the attached postcard.*

Smoke Indicator

THE new smoke indicator, Type A20C-1, indicates the density of smoke passing through the flue or breaching of a heating or power plant, and signals when this density approaches the values prescribed by municipal smoke ordinances. It basically consists of a photoelectric control and light source. These are mounted on opposite sides of the flue, and the light source beam is projected across the flue onto the photoelectric control. A sensitivity adjust-



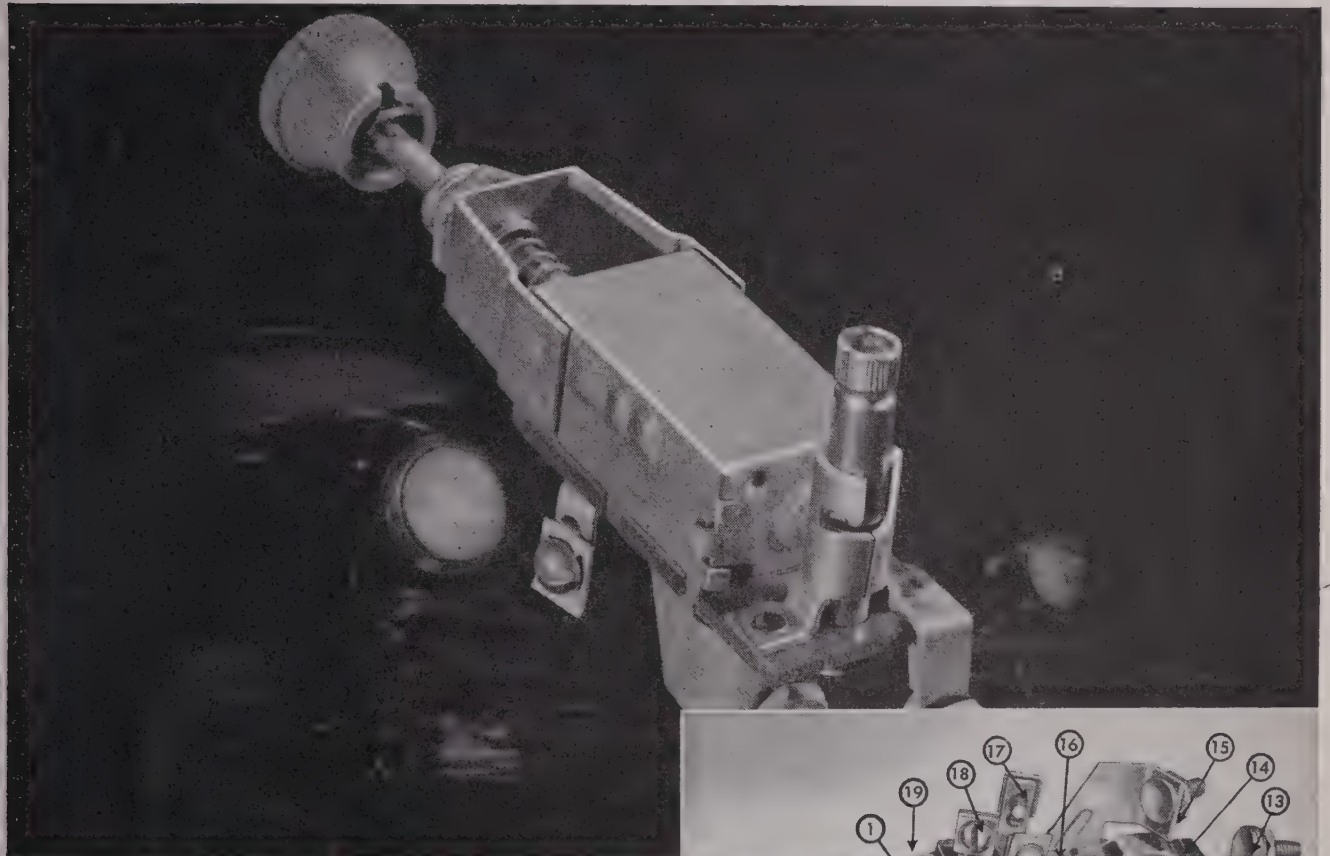
ment permits the equipment to be set so that it will signal when smoke density approaches the prescribed value. Supplementary equipment includes bell alarms, densimeters to give continuous indications of smoke density and recorders to record the time of day that excessive smoke passes through the stack. *Photoswitch, Inc. For more information, check No. 20 on the attached postcard.*

Material Handling Truck

EASE of handling, simplicity, reliability and economy are claimed for a new material handling truck, the Load Dispatcher. The truck is made in hydraulic lift and fixed platform types, as a pallet carrier and as a tractor. The power section is a separate unit in itself,

REVERE MATERIALS + COLE-HERSEE DESIGN ASSURE DEPENDABLE HEADLAMP OPERATION

(Sixty Percent of All Automobile Accidents Occur After Dark)

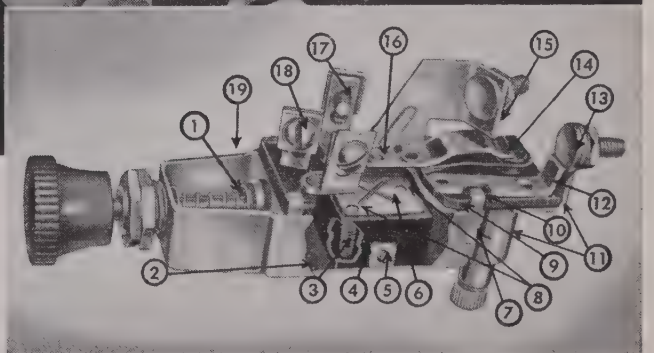


HERE is a picture and sectional view of a device frequently used by motorists, who know nothing about it except that it has a knob and works perfectly when pushed or pulled. It is a Cole-Hersee three-position light switch: Off, Parking Lights, Headlights.

Because such a switch is so reliable and long-lived, one might suppose it to be simple. It is far from that. Its operation, however, is simple, and is protected by design and materials which foresee the conditions and contingencies of use.

Note the variety of the materials. They include steel in several types and forms, brass, phosphor bronze, canvas base bakelite, a felt washer to exclude dust, plastic, and if you include the fuse, lead and glass. In the list of features the four items starred are made of Revere Metals.

This is an excellent example of the manner in which wise manufacturers employ Revere Metals. Both they and we realize that every metal and material has its individual qualities and applications. When these are understood and chosen with full regard for conditions of fabrication and use, a fine product has been given its fundamental guarantee. It is one of the important duties of Revere Technical Advisors to collaborate in the selection of the many different Revere Metals. If you would like to obtain the benefits of this service, get in touch with the nearest Revere Office.



**Three-Position Heavy Duty Headlamp Switch, made by
Cole-Hersee Company, 20 Old Colony Ave., Boston 27, Mass.**

- | | |
|--|---|
| 1. Spring Backed Dustproofed Gland | 12. Heavy Reinforcement and Thrust Stop |
| 2. Heavy Steel Case and Bracket | *13. Terminal Studs Welded to Conductors |
| 3. Four Separate Contact Springs | *14. Heavy Gauge Phosphor Bronze Spring Contacts |
| 4. Moulded Bakelite Contact Carrier | 15. Heavy Conductor and Thrust Stop |
| 5. Double Independent Action | *16. Silver Inlaid Phosphor Bronze Contact Rivets |
| *6. Heavy Gauge Phosphor Bronze Contactor | 17. Heavy Gauge Screw Terminals |
| 7. Interlocking Back Prevents Short Circuiting | 18. Shakeproof Lockwashers With Locking Tail |
| *8. Silver Inlaid Phosphor Bronze Contacts | 19. Bracket Extension To Clear Dash Obstructions |
| 9. Canvas Base Bakelite | |
| 10. Six Clinching Ears | |
| 11. One Piece "Hot Wire" Conductor | |

**Parts starred are made of Revere Metals*

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801
230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere.

• New mechanical handling device speeds up materials movement between presses . . . DeSoto reflects engineering progress in Chrysler cars.



DETROIT—Nearly 10 years ago at the Fisher Body plant in Grand Rapids the first press was equipped with an "Iron Hand"—an ingenious metal jaw that snaps shut on the edge of a metal stamping and hauls it quickly and positively out of a press. Workmen in the Fisher plant promptly fastened a union button on this new automaton and then stood around fascinated as it performed its work.

Inventor of this device whose operations were controlled entirely by the movements of the press is Harry Sahlin, then a Fisher employee. Mr. Sahlin's own company is now producing an improved and greatly simplified model of the earlier device. The latest model is entirely self-contained.

The most recent design is reported to boost production, under some conditions, as much as 50 per cent. At least one of these devices is now used by all the major automobile manufacturers; one major producer has 31 in operation or ready to install.

The earlier Iron Hand was a

crude affair compared to the present model which does everything from lifting a calling card off a table to hauling a floor pan 20x120 in. out of a die. Even larger sheets weighing up to 150 lb can be handled, it is reported. If desired, stampings can be turned over as they are deposited on a conveyer or table.

The Sahlin unloader can be adopted to most types of presses. Its operations are now controlled independently of the press action and can be timed to remove a panel at any time during the upstroke of the press.

Operation of the device is positive and remarkably fast. As the press ram descends and completes the forming operation, the jaw swings quickly into the open die. The knife edge of the lower jaw forces its way under the metal and the jaw, actuated by an air cylinder, snaps shut.

The first action is to lift the panel sufficiently to permit the swinging movement that removes the part from the die. Both the grip—which is usually at a point less than three-quarters of an inch from the edge of the sheet—and the arm are adjustable.

The swinging movement is controlled by a cam. This arm is also actuated by an air-cylinder, designed to operate at air pressures as low as 50 lb. If desired an oil cylinder can be installed to snuff out vibration as the arm swings back to position for the next unloading operation.

Under practically all circumstances, the Iron Hand permits rapid die changes and adjustment of the hand can be made quickly, according to Mr. Sahlin, to accommodate a new die.

Installation is accomplished by drilling and tapping four mounting holes on the press. A limit switch is installed in the press switch box. After connecting air lines and installing electrical connections, the Hand is ready for trial operation.

A remarkable feature of the device is its flexibility. Jaws are adjustable. In and out as well

as up and down. The angle of the jaw travel into the die is also adjustable. Depending on the arm, a panel can be swung out of a die a distance up to 14 ft. More than one part can be removed from a die at a time if desired.

Up to the present time the Iron Hand has been used to best advantage to speed up press operations. It makes its best showing where unloading is time-consuming and often a monotonous operation, sometimes requiring 2 or 3 persons. The device can also be used, it is reported, to unload welding machines and shears. Cost is approximately \$2800.

* * *

ENGINEERING details of the new DeSoto, released this week indicates that Chrysler technicians have, as usual, been busy designing and testing new devices for the Chrysler line of cars. While the motoring public may be unaware of the "tremendous trifles" to which Chrysler has given deserved attention automobile engineers and metallurgists will recognize many of the steps taken as being distinctly forward from an engineer's standpoint. Unfortunately, only a few of the engineering changes in the new car can be discussed here.

Cylinder walls of the DeSoto engine will be Parko-lubrite treated to give improved engine life and greater resistance to scuffing.

A larger air cleaner silencer provides increased quietness in engine operation. A longer breather pipe with improved sealing is expected to improve servicing and afford greater protection against dust. The new fuel pump has higher capacity than the earlier models. A more flexible curved upper radiator hose will replace the straight hose formerly used. The radiator top tank fitting has been changed from a malleable casting to a short straight brass tube; a distributing baffle has been added to the top tank.

A new type pressure cap for the cooling system is reported to prevent loss of anti-freeze during



...in one setting...
in 10 minutes... 19
separate operations!

ON THE POTTER & JOHNSTON 6DRE AUTOMATIC

—that's tooling for you

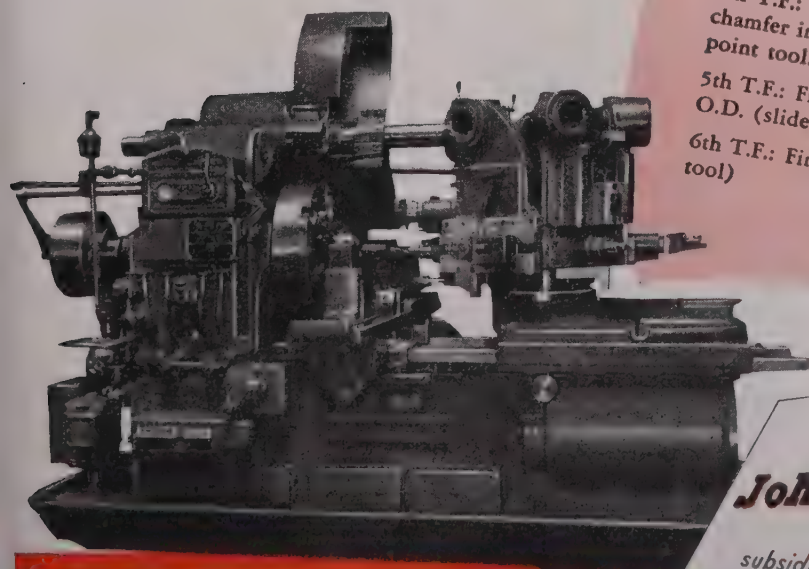
—the kind of time and money saving tooling that production-minded executives and engineers have learned to look for when they put it up to Potter & Johnston.

You can never be sure that your parts production is accomplished the fastest, most accurate, most economical way until you let P&J engineers have a look at the parts or prints and compare their tooling recommendations and time estimates with what you're doing now. Why not see what they have to say. It puts you under no obligation.



The Steel Forged Oil Well Drill Bit pictured above is gripped by a 3 jaw chuck, and here is what happens to it on the P&J 6DRE Automatic:

- 1st T. F.: Drill inside dia. to depth; turn O.D. straight to chuck jaws; remove portion of stock from bevel.
- 2nd T. F.: Rough bore two inside dias. and face bottom of one dia.; remove portion of stock from bevel.
- 3rd. T.F.: Form radius and angle on outside dia.; remove remaining rough stock from bevel; rough face end; rough C'bore 3.798" dia.
- 4th T.F.: Finish bore three inside diameters, chamfer inside dia.; machine bevel with single point tool.
- 5th T.F.: Finish bore inside dia.; turn taper on O.D. (slide tool)
- 6th T.F.: Finish face end; form ball race (slide tool)



6DRE AUTOMATIC

**Potter &
Johnston Company**

Pawtucket, R. I.

subsidiary of Pratt & Whitney
Division Niles-Bement-Pond Company



high temperature emergency periods. This will be available as special equipment at extra cost.

The new clutch will have a heavier over-center spring. The clutch pedal has been changed to run through the frame and is mounted on straight roller bearings. A more rigid connection for the frame end of the torque shaft is provided.

Longer life and more simple servicing of transmission components is made possible by extensive changes in the electrical and hydraulic systems.

Cycle-bonded brake linings will replace the riveted linings previously used.

A new double pawl mechanism will permit setting of the hand brake with less effort.

Side sway will be minimized by new type "Sea-leg" shock absorbers at the rear of the car. Longer front spring life is expected as a result of increasing static height of the spring $1\frac{1}{4}$ in.

IMPROVED accessibility for lubrication of the lower control arm on the front suspension is made possible by an offset in the front sway bar.

The new cars feature a center-steering system with a three-tooth

roller steering gear and tie rods of equal length to each wheel.

The new wheelbase length is $125\frac{1}{2}$ in., an increase of 4 in. Greater frame strength is provided at the front bumper attachment by the addition of a new reinforcement plate.

Instrument panels will feature "black light" illumination.

Increased effectiveness in light output of the stop light, tail-light and parking lights is obtained through the use of plastic lenses which are reported to have optical properties superior to earlier designs. The new starter unit is more compact and will have forged and hardened cams. Greater generator output will be provided during initial car operation by the use of a bi-metal hinge on the current regulator. A new battery sealing compound will be used to protect against leaks.

The starter switch operates merely by turning the ignition key. The starter button has been eliminated.

Greater protection against theft is provided by armoring the cable from the ignition switch to the engine compartment. Quieter speedometer operation is made possible by the addition of bronze

bushings and a larger lubricant wick capacity.

The car keys have been redesigned in aluminum to resist breakage in locks. Easier servicing of locks is made possible by a new door lock retainer.

Greater protection against corrosion is accomplished by the use of a sprayed sound-deadening material on the wheel side of the front fender shields, the trunk side of the rear wheel house and the upper side of the body floor panel.

Additional cushion springs can be added to provide additional seating comfort. The cushion now includes four rows of springs held together by helical spring ties replacing the six rows previously used. If additional support is required, more cushion springs can be inserted in a few minutes, it is reported.

AN example of a steel product that is well-designed from the standpoint of engineering and manufacture and yet is unusually flexible in operation is the variable coil spring seat produced for the past three years by the Monroe Auto Equipment Co. of Michigan. More than half a million of these seats have already been produced.

An unusual feature of the variable coil spring is that it will sustain unusually heavy loads without "bottoming". Design of the E-Z Ride variable rate coil tractor spring is telescopic—combining the resiliency of a soft spring with the strength and loading capacity characteristic of medium and stiff springs. Because of the telescopic design, the spring changes frequency with each coil compression and coils fit inside rather than on top of one another. Monroe engineers report there has never been a complaint from the field indicating that sagging had occurred.

The wire used to produce the variable rate coil tractor springs is .362 dia spring wire. Springs of this design compress only in relation to the weight of the occupant. Thus, an 80 lb operator is said to be afforded the same riding comfort as a 200 lb operator.

The frame for the seats is produced from SAE 1010 7 and 9 gage steel. The seat pan is stamped from 16 gage sheet steel.

DEEP FREEZE: Fisher Body's new push button type outside door handle, two locks and a control ventilator get a severe test at 20° F below zero in this deep-freeze before being okayed for production.



the trend is to

N-A-X

HIGH-TENSILE STEEL

for

**BUMPERS • GRILLES • HOODS
FENDERS • BODY PANELS • DECK LIDS
FRAMES • BRACINGS • WHEELS • HUB CAPS
AND OTHER AUTOMOTIVE PARTS**



for High Strength • Finer Grain Structure • Good Formability • Great Impact-Toughness • Excellent Weldability
High Corrosion-Resistance • High Fatigue-Resistance

N-A-X HIGH-TENSILE MEETS ALL REQUIREMENTS OF S.A.E. 950



GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
Unit of National Steel Corporation

• Munitions Board seeks speed for stockpiling program . . . Over 400 plants available for war operations . . . Only 30 pct of minimum reserve raw materials stockpiled.



WASHINGTON — For the first time since the end of the war, the Munitions Board apparently feels that it is in a position to speak up without being accused of war mongering, raiding the Treasury, or putting the squeeze on the domestic economy. It has come out fighting.

"We feel that the . . . time has now arrived when we must think more strongly in terms of national security," Board Chairman Carpenter has told Congress. He added that serious deficiencies in critical stockpiling materials must be made up, even if it means setting aside certain amounts from the short supply available to industry in general.

Back of this stiffening attitude on the part of the Board are several basic facts. Only about 30 pct of the stockpiling goal has been reached although more than half the allotted 5-year period has passed. Moreover, the stockpile is admittedly unbalanced — that is, many of the materials bought to

date are in the less critical categories of the A and B classifications.

Also irking the Board is the fact that it has been taking a beating, considerable of it unjustified, at the hands of its critics. For instance, the Board has been criticized for leaning backwards in order to not disrupt domestic needs by going on the open market for scarce materials.

Stockpiling represents only one phase of the Board's job. Generally speaking, the Board must lay out an overall program covering all aspects of industrial mobilization in an emergency such as war.

In this respect, it might be well to review some of the other accomplishments of the Board. Under Public Law 364, it has now provided for 158 standby war plants in addition to 27 permanent arsenals and shipyards. Most numerous of these are aircraft, explosive and armament plants, all of which would be vitally important in wartime and are the toughest to get going. Of the standby plants, 84 are assigned to the Navy, 48 to the Army and 26 to the Air Force.

Under Public Law 883, the Board has provided for additional plant and machine tool reserves which could be recaptured by the government and converted to war production in an emergency. These include the surplus disposals under the Security Clause which stipulates that the equipment so bought or leased must be maintained in such condition as to permit recovery and conversion within 120 days or less.

In this category, the latest count reveals 234 plants—114 for Navy, 56 for Air Force, 45 for Army, and 19 under control of the Munitions Board.

THE count for machine tools and production equipment is less exact. Existing legislation provides a reserve of 182,000 items from war surpluses. As of last September, more than 98,000 items had been allocated and accepted

with nearly 73,000 of this total either in storage or in transit. Several thousand more have been earmarked and shipped since that time.

The Board also has inaugurated a preparedness program with the cooperation of industry by setting up an "allocation" program. This merely consists of lining up manufacturing establishments which normally would hold prime contracts in the event of war.

Plants willing to cooperate are usually assigned to one of the armed services. Representatives from the military establishments consult with the "allocated" plants in developing plans for conversion, estimating potential capacity, and otherwise preparing for national defense.

To date, approximately 16,500 plants have been recorded in which the overall military establishment could place prime contracts. Out of this number, about 14,000 have been tentatively assigned to the various services to permit initial planning conferences and contacts.

Procurement officers are currently making plant visits, helping work up potential production schedules, etc. They have visited and surveyed more than 600 such plants so far.

As to stockpiling, the original goal in dollar volume was set at \$3.1 billion of which \$300 million worth was to be obtained from government surpluses, etc., leaving the new cost at about \$2.8 billion. In the 30 months which have passed since the program started, rising prices make it look as if the final cost will be nearer \$3.5 billion.

In his recent report to Congress, Defense Secretary Forrestal points out that with the program now rolling along, the Board has been able to cut red tape in numerous instances. For instance, the Board can now authorize the Federal Bureau of Supply to purchase limited quantities of certain materials without specific orders. This enables the FBS to take advantage of spot transactions which might otherwise go by the Board if the

Whether **AC** or **DC** there's EXTRA PROFIT for you with **HOBART simplified ARC WELDERS**

With Hobart Simplified Arc Welders you get profits that are not mere claims but actual facts—facts that you can prove to yourself by actual test.

An actual test will bring out facts that are immediately apparent, such as cooler operation, extra capacity, easier arc control, and time-saving exclusive features—which make it easier for your operator to do more welding per day with better penetration, with fewer rejects, and with less effort to them.

If you are not using Hobart Welders on your production, construction or maintenance work, it's time you made an investigation of these money-saving, profit-making welders. An investigation costs you nothing—in fact, we're anxious to show you how Hobart Simplified Welders can help you in these days when higher production costs and lower profits are a real problem. Just mail the coupon for complete details—no obligation.

HOBART BROTHERS COMPANY

BOX 1A-29, TROY, OHIO

"One of the World's Largest Builders of Arc Welders"

HOBART D.C. electric welder

HOBART A.C. industrial welder

HOBART ELECTRODES

A complete line for every welding purpose, made by Hobart in their modern plants.

HOBART simplified arc welders

Fill out and MAIL today!

Enroll now!

Special "brush-up" courses

A modern school, teaching new welding techniques, both arc and gas. A "brush-up" course brings you up-to-date on everything that's new. Low in cost, a non-profit school. Write for details.

The HOBART SCHOOL of welding

Practical Design for Arc Welding

Gives you in design form hundreds of ideas on how to use welding with profit. **\$3.50**

Per. Vol.

HOBART BROTHERS COMPANY, Box 1A-29, Troy, Ohio

Am interested in extra profit through use of Hobart Welders. Send complete information and catalog on

☐ A.C. WELDERS ☐ D.C. WELDERS

Also send information on ☐ WELDING SCHOOL

☐ HOBART ELECTRODES

Name _____

Firm _____

Address _____

FREE!

☐ Hobart
"Guide
to Better
Welding"

Treasury had to go through the normal routine.

It is also reported that the impact upon industry of buying scarce materials has been lessened to some degree by the expedient of buying on long term commitment and delivery. In effect, this also has the effect of stabilizing markets.

AS TO the current stockpile status, it is now valued at about one-third completed when measured in dollar value. This includes prewar left-overs, surplus transfers, postwar buying, and contract authorizations which have been made.

Starting with a nest egg of \$86 million worth still in the stockpile in 1946, some \$424 million worth was later transferred from government agencies—largely the WAA and RFC. Another \$30 million is in sight from war surpluses, bringing the total to \$540 million worth without requiring new money.

In addition, Congress has appropriated \$800 million (including contract authorizations) for acquisition of stockpile materials. Nearly all this latter amount has been spent or committed—making the total about \$1.3 billion, leaving about \$2.1 billion worth to be ac-

quired over 30 months if the time limit is met.

A potential source for strategic materials has been the Marshall Plan. So far, this has not paid off except in one or two negligible instances. However, a subcommittee of the executive committee on Economic Foreign Policy (State Dept.) is completing a study on the subject. Marshall Plan nations are committed, as part of their agreements, to transfer such materials to the United States in such quantities as may be available.

WAA Gets New Life

Washington

• • • Congress, which last year ordered by statute that War Assets Administration close out its books on March 1, has changed its mind again. It is giving the agency a new lease on life.

Falling into line with the white house proposal for extension of WAA until a central property management bureau can be set up, Congress has passed a bill which continues the agency through June 30, 1949.

It was pointed out in the committee report that it would be a costly, complex job to divide up

the functions of WAA between four agencies and then to reassemble them under a single bureau.

This is interpreted generally as meaning that the new agency will be set up by Congress later to take over the handling of \$2 billion worth of real property now in the care of WAA as well as other property now managed by various governmental agencies.

Contract to Honeywell

Washington

• • • Acting as an agent for the Economic Cooperation Administration, the Export-Import Bank has signed a \$300,000 guaranty contract with the Minneapolis-Honeywell Regulator Co. which manufacturers indicating, recording and other instruments used by steel and other manufacturing industries.

M-H will invest the entire amount in its subsidiary, Honeywell-Brown, Ltd., which has leased a plant at Glasgow, Scotland for parts fabrication. The contract guarantees only the original investment and does not insure profit.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Names NSRB Chairman

Washington

• • • Ex-Governor Mon Wallgren of Washington was named by the White House to fill the vacant chairmanship of the National Security Resources Board. John R. Steelman, presidential assistant, has been acting chairman since resignation of Arthur M. Hill.

Wallgren is widely known in the Capital, having served in Congress, both as a representative and a senator, for about 12 years between 1933 and 1945.

Leaves Security Board

Washington

• • • Reginald E. Gillmor has resigned as vice-chairman of the National Security Resources Board following a 6-month tour of duty with the government to return to private industry. He was a former president of the Sperry Gyroscope Co. and previously headed the industry division of the American Mission to Greece.

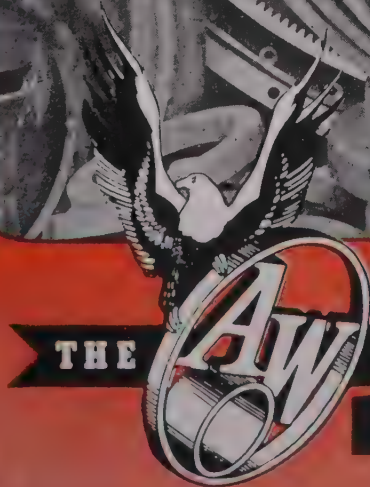
FLASH-BUTT WELDED RINGS and BANDS *by* AMERICAN WELDING

Flash-butt welded rings and bands . . . both carbon and alloy . . . prove to be superior. Records show that there is a substantial

SAVING IN THE PRICE OF RINGS SAVING IN THE COST OF TOOLING

when rings and bands are produced by the American Welding "Controlled Technique" process of flash-butt welding.

If you use rings, bands, or any other welded product, send your specifications, quantity, and prints for prompt quotation.



4" TO 96" IN DIAMETER

AMERICAN WELDING

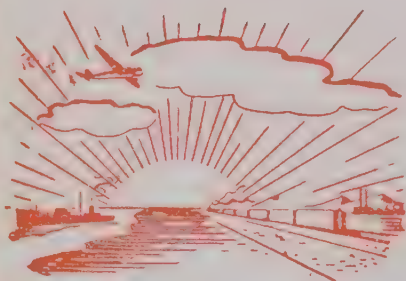
AND MANUFACTURING COMPANY

120 DIETZ ROAD • WARREN, OHIO



Send for
16 page
catalog

• Coast rail rates deemed unfair by water shipping interests . . . Metal industry future reported bright in Los Angeles area . . . Shipbuilding revival in West held doubtful.



SAN FRANCISCO—Steel producers are interested spectators in the battle being waged between the Maritime Commission and the railroads over the question of whether rail rates along the Pacific Coast should be increased to provide an umbrella for coastwise shipping.

Railroads operating in California recently were placed in the position of petitioning the State Public Utilities Commission for higher intrastate freight rates equivalent to those granted by the Interstate Commerce Commission on Jan. 11. The Union Pacific, Santa Fe, Western Pacific and Southern Pacific made the appeal.

Now western railroads find themselves in a position of sustaining their rate structure and denying the contention of ship operators that railroads have unduly suppressed rates to eliminate water shipments.

Shipping interests argue that they cannot operate under the present low rate which is now in effect and that before water rates can be increased, rail rates must be raised and that competing railroad rates along the Coast are unfair. In 1939, the last year coastwise shipping flourished, approximately 3000 to 4000 tons of steel moved by boat up and down the

Coast. This figure includes sheets, plates, ingots, wire and some miscellaneous products. Intercoastal shipments of steel in the same year exceeded one million long tons.

Marshall E. Boyd, of the Western Pacific R.R., represented all railroads concerned at the hearing before ICC Commissioner Clyde B. Aitchison and attempted to prove that the rates now being charged are within reason.

LOS ANGELES—Building and expansion of metal industries in the Los Angeles area is destined to continue indefinitely with an increase of 100 pct expected in 12 years.

This was the analysis of William H. Eisenman of Cleveland, national secretary of the American Society for Metals, after a survey of southern California industry.

The survey was followed almost immediately by verification by Bethlehem Pacific Coast Steel Corp. of THE IRON AGE reports of plans for a new 75-ton furnace at its Maywood plant, and by several other announcements of increases in steel parts plants.

"Economic factors assure the permanency of the Los Angeles metal industry," Mr. Eisenman said. "Steelmen throughout the nation concede that southern California has a large supply of satisfactory grade iron ore, the necessary high grade native limestone for flux and a long-time sufficiency of coal from Utah and Washington from which coke can be made.

"In addition, the supply of high grade iron ore in one mountain east of Indio now is being mined by Kaiser Steel Co. and converted into steel at Fontana. The ore in that area is sufficient to supply Los Angeles for several years.

"But in addition to this source," Mr. Eisenman continued, "steel will continue to flow here from the U. S. Steel Corp. plant at Geneva, Utah, to augment the local supply. An additional supply is assured from eastern mills which utilize iron from Mesabi range in Minnesota.

"Development of additional power in the Southwest, cost differentials and the trend toward plant decentralization will go along with natural resources and the western market in expanding the Los Angeles industrial system.

"As one indication of what may be expected, the automotive industry is fabricating as many parts here for local assembly as can be produced profitably. The Los Angeles area already ranks second only to Detroit in assembly of cars.

"The area has proved its ability to produce steel and fabricate structural beams, machinery and consumer products," Mr. Eisenman said in conclusion.

Mr. Eisenman will manage the Western Metal Congress and Exposition in Los Angeles, Apr. 11-15.

APPARENTLY unaffected by recent cutbacks in Air Force contracts, small plants in the Los Angeles area (those with less than 500 employees) now have a total of \$54 million worth of business on their books and this volume will increase, Col. Thomas A. Chapman, commanding officer of the Air Force Procurement Field Office for the southern California area, has revealed.

"The total is certain to increase in 1949," he told THE IRON AGE. Cutbacks have been experienced by some of the major airframe companies, including North American, however.

Many of the "small business" subcontracts are handled by larger companies which maintain war-born subsidiaries for this purpose. Typical is the Day & Night Mfg. Co. which makes water heaters, does welding, tubing and stamping work.

Contracts to small firms, except those given by airframe manufacturers, are granted through Wright Field to the "lowest" responsible bidder. Little work is available for foundries but contracts will be let in many other metal industries, the Air Force officer said. Some total as high as \$1 million cash.

BRAZED AND HARDENED AT THE *Same* TIME



ONE EVERY
20 Seconds!

with **TOCCO*** Induction Heating

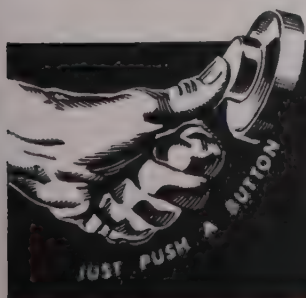
Your product may be very different from the Kennametal coal-cutting bit shown here, but if you have to harden, braze, anneal or forge it, TOCCO can probably improve your product, speed your production and cut your costs.

Engineers at Kennametal, Inc., Latrobe, Pa., have hit upon a thrifty production shortcut that saves time and expense and improves their product, too. The mining-machine bit is heated to 1600° F, brazing the carbide insert to the steel shank. The cutter is then quenched, hardening the alloy steel shank to 47-52 R.C. Result: a super-tough cutter that will stand the most rugged production tests with a carbide tip that's on for life.

Besides combining the hardening and brazing operations TOCCO has stepped up production to the rate of one part every 20 seconds—nearly twice the production obtained by former methods—with a consequent reduction of unit costs.

TOCCO engineers are ready to survey your operations to find where TOCCO Induction Heating can help you improve your products, speed your production and reduce your costs.

THE OHIO CRANKSHAFT COMPANY



TOCCO

*Trade Mark Reg.
U. S. Pat. Off.

Mail Coupon Today

NEW **FREE**
BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-3, Cleveland 1, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Brazing".

Name

Position

Company

Address

City Zone State

Labor and Civic Groups Agitate for Revival Of Coast Shipbuilding

San Francisco

• • • Agitation by organized labor groups and civic organization for a revival of shipbuilding on the West Coast has little chance for success in the opinion of competent observers in this industry.

Among those working to get contracts for ship construction in the West are the Seattle, Wash., Metal Trades Council, the Central Labor Council of Los Angeles and the program is being coordinated by the Pacific Coast committee for shipbuilding for national defense.

During the war West Coast yards turned out approximately 40 pct of the ships built and it is argued that the yards which made such phenomenal records during that period should be maintained in operation and retain the skilled manpower developed. The Pacific Coast Metal Trades Council, an organization comprising all metal trade unions affiliated with the AF of L, has contended that the Gulf yards and the East Coast yards are being favored over this area.

Owners and operators of the

West Coast yards, although eager and anxious for contracts, are frank to admit that both material and labor costs are higher in this area than in competitive areas and hence any bids submitted from here would in all likelihood be considerably higher than competition. While both the Geneva Steel plant in Utah and the Kaiser Co. plant at Fontana, Calif. can and have produced ship plates, both mills are booked heavy into the immediate future and if ship plate had to be brought in from eastern mills the cost would be completely prohibitive on a competitive basis. Both of these steel plants are also engaged in the production of other products which carry a considerably higher profit margin and unless a national emergency arose it is doubtful whether the local plants could be induced to increase plate production.

Leases Government Plant

San Francisco

• • • Rohr Aircraft Corp. has taken a 5 year lease on a part of the government-owned Aircraft Parts plant which they operated at Chula Vista, Calif. during the war. Rohr will manufacture military equipment for the Air Force.

Abolishing of Basing Points Not Unanimous Despite Controversies

San Francisco

• • • In spite of surveys, polls and untold numbers of meetings of industrialists, there still seems to be a lack of unanimity of thought on the subject of the abolishment of the basing point system of pricing.

The report that "the period of doubt and uncertainty as to the legality of pricing methods soon will be ended (THE IRON AGE, Feb. 17, 1949, p. 110) is classed under the heading of "good news" by many, but not all, businessmen.

Throughout the West, chambers of commerce have been trying to ascertain just how their members feel about the problem without too much success. Several chambers have taken the stand that clarification of the issue is of prime importance and that local hearings should be held in the West to determine business' views.

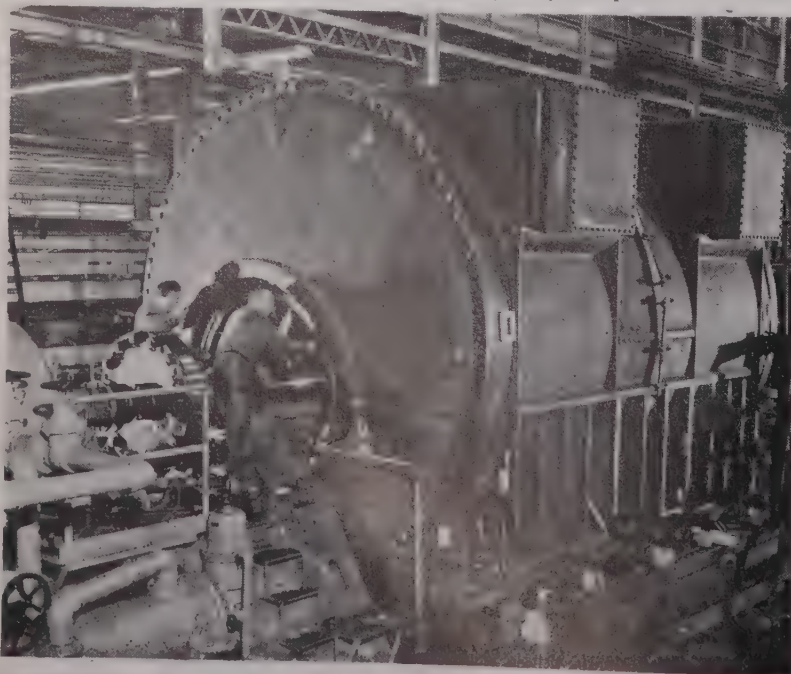
In Portland a special meeting of industrial committeemen, 25 members favored enactment of legislation to permit use of the basing point system, one voted against it and four expressed no opinion.

In Spokane the board of directors of the chamber voted "yes" on the U. S. Chamber of Commerce referendum.

An extensive survey undertaken through the Los Angeles Chamber of Commerce of its members on this subject has brought in only 100 questionnaires which have remained unopened and will not be opened until probably 400 are received, as that number is considered the minimum for an adequate cross-section.

The Long Beach Chamber of Commerce adopted this resolution: "The Long Beach Chamber of Commerce does not believe it is in the best interests of our nation and its economy to force by law, administrative edicts or judicial interpretations a change in pricing methods by American business and industry to conform to a uniform f.o.b. mill pricing pattern." This organization also termed the abolition of the basing point as another move "to tighten bureaucratic grip on business."

A BIG LOAD: Eight railroad cars are needed to move this 75,000 kw turbine generator from the Westinghouse Electric Corp. plant to the City of Los Angeles Harbor plant at Wilmington, Calif. Workmen are shown here preparing for the final test runs at the company's East Pittsburgh plant. The generator is dismantled into five major parts for shipment.





FIRST
QUALITY

the only plant in the world devoted entirely

to the manufacture of

HIGH SPEED STEELS

D CUT SUPERIOR—America's
best known tungsten high speed steel—
all cutting purposes.

ASCO M-2—Tungsten-Molybdenum
high speed steel for general cutting
purposes.

AN-LOM and 8-N-2—Molybde-
nium high speed steels, for general
cutting purposes.

D CUT COBALT—Extra Duty—
heavy cuts, fast speeds, hard or abra-
sive materials.

RAY CUT COBALT—Super Duty—
heavy cuts, high speeds, heat treated
abrasive materials.

ATRO—Superior Wear Resistance
delivers top performance on non-
ferrous materials, cast steel, cast iron,
and heat treated steels.

ASCO SUPREME—Entirely New—
higher hardness, higher wear resistance,
higher hot hardness, higher speeds.

We do not compromise quality by combining in a single plant the manufacture of carbon and alloy tool steels with High Speed Steels. Our Vanadium Works* is devoted entirely to the manufacture of High Speed Steels, and is the only plant in the world so constituted . . . with melting furnaces, heating furnaces and furnace atmospheres, roll designs and even hammer blocks designed especially for the purpose—and used by men trained as specialists. NO WONDER these are *First Quality* High Speed Steels. Come and see for yourself—anytime.

*(Carbon and Alloy Tool Steels are made at our Colonial Works)



Vanadium-Alloys Steel Company

COLONIAL STEEL DIVISION
ANCHOR DRAWN STEEL CO.

Latrobe, Pa.

PERSONALS

o o o



JOHN W. VANDERSLICE, chief industrial engineer, Oliver Iron & Steel Corp.

• **John W. Vanderslice** has been appointed chief industrial engineer, Oliver Iron & Steel Corp., Pittsburgh. Mr. Vanderslice joined the Jones & Laughlin Steel Corp. in 1933. In 1940 he became an industrial engineer with Carnegie-Illinois Steel Corp., and later a production supervisor for Kaiser Steel Co. and supervisor of industrial engineering for Lockheed Aircraft and Goodyear Aircraft companies.

• **L. A. Peck** has been named vice-president in charge of sales for the Herrick Iron Works, Oakland, Calif. Mr. Peck had recently been employed by Judson Pacific-Murphy Corp. as general manager of sales. Previous to that he had been employed by Herrick Iron Works and has been associated with the steel fabricating industry for more than 12 years.

• **K. H. Bender** has been named sales manager of the mid-continent district of Pittsburgh Steel Co., with headquarters in Tulsa, Okla. He formerly served as tube sales engineer at the company's general office in Pittsburgh. **T. R. Miller** has been appointed assistant sales manager of the Tulsa office.

• **Basil W. McCartan**, western New York representative of the Braeburn Alloy Steel Corp., Braeburn, Pa., has been named district sales manager with headquarters in Buffalo.

• **John Metcalf** has resigned as vice-president and general manager of the Fitzsimons Steel Co., Youngstown. **William F. Stewart** has been named to succeed Mr. Metcalf. Mr. Stewart has been general superintendent since 1930. **William A. Lampe** has been elected vice-president in charge of sales. Mr. Lampe has represented the company in the Cleveland area for many years.

• **James R. Beers** has been appointed assistant district manager of the Pittsburgh warehouse of the U. S. Steel Supply Co. Mr. Beers moves to the Pittsburgh post from a similar position in the Milwaukee office of the company, which he held since 1943. He joined U. S. Steel in 1920 as a salesman for Illinois Steel Co. in Chicago. In 1938 he was transferred to the Milwaukee sales office of Scully Steel Products Co., where he served as manager until U. S. Steel Supply established a warehouse there in 1943.

• **Harry D. Coulton** has been appointed sales manager of the eastern direct sales division of the Glidden Co., Reading, Pa. Mr. Coulton joined Glidden in 1934.

• **Thomas L. Moore** has been appointed to the sales staff of Armco Steel Corp., Cleveland, with headquarters in Baltimore, and working out of Armco's Philadelphia district office. He had formerly been assistant manager of the development engineering department, Rustless division of Armco in Baltimore.

• **John T. McHugh** has been appointed department superintendent of the nail mill at the Donora, Pa., steel and wire works of American Steel & Wire Co. Mr. McHugh joined American Steel & Wire in 1939 as an office clerk in the nail mill at Donora and progressed through the ranks. He has been turn foreman in the nail cutting and inspection department since 1946.



ROBERT L. SPRINGER, district manager, Firth Sterling Steel & Carbide Corp.

• **Robert L. Springer** has been appointed Chicago district manager for the Firth Sterling Steel & Carbide Corp., McKeesport, Pa. Mr. Springer has served the tool and die industry for nearly 20 years. Previous to his new appointment he had been assistant manager of the Chicago district of Firth Sterling.

• **Edwin A. Glenn, Jr.**, has joined the New Holland Machine Co., New Holland, Pa., as metallurgist for the development engineering department. Prior to joining New Holland, Mr. Glenn had been senior metallurgist in the research department of the Mack Mfg. Corp.

• **D. L. Swinnerton** has been named executive vice-president; **Robert S. Grover**, vice-president and treasurer, and **D. L. Robertson**, vice-president in charge of sales, Apex Steel Corp., Ltd., Los Angeles.

• **George M. Neal** has been appointed assistant to the manager of industrial relations, Tennessee Coal, Iron & Railroad Co., Birmingham. Mr. Neal became associated with TCI in 1938.

• **Quentin Graham** has been elected a vice-president of Elliott Co., Jeannette, Pa. He joined Elliott in 1944 and in 1946 was appointed manager of the Ridgway Div.

WHAT DO YOU NEED?

— BUT QUICK!

SPECIAL CONTRACT
ITEMS TO YOUR
SPECIFICATIONS

TOOL TOTES

TOOL CRIB

SHOP BOXES

SHOP EQUIPMENT

FOLDING CHAIRS

DRAWER UNITS

WORK BENCHES

SHOP DESKS

CABINET BENCHES

TOOL ROOM EQUIPMENT

TOOL TRAYS

STEEL COUNTERS

STOOLS

SERVICE CARTS

TOOL STANDS

HANGING
CABINETS

HOPPER BINS

BENCH LEGS

FLAT DRAWER FILES

PARTS CASES

TOOL BOXES

BAR RACKS

FILING CABINETS

SHELVING

LOCKERS

KITCHEN CABINETS

YOU FURNISH the STEEL LYON

WILL MAKE the PRODUCT

● We buy the steel from you and ship the pound-for-pound equivalent in any selection of LYON products, at regular published prices (see partial list below) or special assemblies, sub-assemblies,

parts, etc., for your products—to your specifications.

For complete information about the "customer steel plan" get in touch with your nearest LYON District Office.

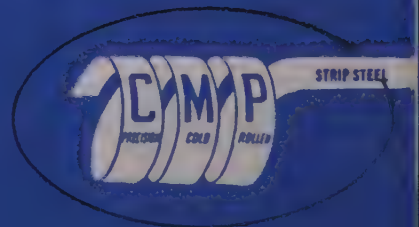
A PARTIAL
LIST OF
LYON
PRODUCTS

LYON METAL PRODUCTS, INCORPORATED

General Offices: 236 Monroe Avenue, Aurora, Illinois
Branches and Dealers in All Principal Cities

- | | | | | | | |
|------------------------|---------------------|-------------------|--------------------|--------------|-----------------|---------------------------|
| • Shelving | • Kitchen Cabinets | • Filing Cabinets | • Storage Cabinets | • Conveyors | • Tool Stands | • Flat Drawer Files |
| • Lockers | • Display Equipment | • Cabinet Benches | • Bench Drawers | • Shop Boxes | • Service Carts | • Tool Trays • Tool Boxes |
| • Wood Working Benches | • Hanging Cabinets | • Folding Chairs | • Work Benches | • Bar Racks | • Hopper Bins | • Desks • Sorting Files |
| • Economy Locker Racks | • Welding Benches | • Drawing Tables | • Drawer Units | • Bin Units | • Parts Cases | • Stools • Ironing Tables |

THINSTEEL will lead you to



Right now you're probably checking all possibilities toward strengthening or maintaining your products acceptance without increasing manufacturing costs. One of the answers may be the type and grade of strip steel you specify. Have you the facts on Thinsteel? Would the new and exclusive bright annealed 18-8 Stainless that reduces finishing and polishing costs help you or would electro zinc-coated Thinsteel for corrosion resistance and positive paint adherence add a new sales making advantage? Would close-tolerance annealed spring steel uniformly spheroidized for consistent response to heat treatment increase your yield and reduce over-all production costs? These and similar questions can easily be answered by the best test of all — run a trial lot of Thinsteel against any other competitive product and compare the results you obtain with your past experience. We're confident Thinsteel advantages will prove themselves on your production line. Your inquiry will bring interested and cooperative attention.

- EXTRA LONG COILS less downtime
- EXTREMELY CLOSE TOLERANCE more parts per ton
- WIDE RANGE OF PHYSICALS AND ANALYSES . . . tailored for your products
- GAUGES THIN AS .001" strength with lightness

NEW YORK • CHICAGO • DETROIT • ST. LOUIS • INDIANAPOLIS • LOS ANGELES



KEMPTON DUNN (left), vice-president and **CYRUS E. BRUSH** (right), secretary, American Brake Shoe Co.

• **Kempton Dunn** has been elected vice-president and **Cyrus E. Brush**, secretary, American Brake Shoe Co., New York. Mr. Dunn has been with Brake Shoe since 1932. He was elected treasurer of the company in 1942 and assumed the additional duties of secretary in 1947. He continues to serve as treasurer. Mr. Brush joined the company in 1946 as an attorney. He became assistant secretary in 1947.

• **Stuart H. Smith** has been appointed Cincinnati district manager of SKF Industries, Inc., New York. Mr. Smith, who joined SKF in 1934, has been assistant district manager of the Detroit office since 1944. **C. N. Benson** and **D. B. Eden** have been named field representatives in Boston, **A. R. Ehrnschwender**, in Cincinnati, **J. T. Paradise** in Atlanta and **G. L. Hansen** in Portland, Ore. Mr. Benson joined SKF in 1916 and served as supervising engineer of the paper mill division for many years. Mr. Eden had formerly been quality-control supervisor. Messrs. Ehrnschwender, Paradise and Hansen joined the firm last year.

• **Albert A. Goodson, Jr.** has been appointed district sales manager for the Texas territory, Penn Metal Co. Inc., Boston. Mr. Goodson has his headquarters in Houston and takes the place formerly held by **W. N. Spires**, who died.

• **Dr. B. H. Alexander**, formerly professor of metallurgy at the Carnegie Institute of Technology, has joined the staff of the metallurgical research laboratories of Sylvania Electric Products, Inc., Bayside, N. Y., heading a group of scientists engaged in fundamental studies of the physics of metals.

• **Edward R. Taylor**, formerly merchandising manager, Hotpoint, Inc., Chicago, has been named manager of market development. **John E. Bogan** has been appointed to fill the merchandising post. Mr. Bogan had formerly served as sales consultant to the American Gas Association.

• **Frank R. Sargeant**, formerly secretary-treasurer, the Yoder Co., Cleveland, has been promoted to the position of executive vice-president and treasurer. **Douglas O. Yoder** has been named assistant to the president and **Edmund H. Kanzenbach**, secretary.

• **E. L. Phillips** has been appointed sales manager of the western warehouse division of the Cold Metal Products Co., Youngstown, Ohio, serving the Pacific coast.

• **Francis W. Vigneault, Jr.** has been named district representative for tractor equipment in the northeastern territory of the Hyster Co., Portland, Ore. Mr. Vigneault has been with Hyster since 1940.

• **Vernon O. Droege** has joined Youngstown Sheet & Tube Co. as division engineer in the industrial engineering department. Mr. Droege formerly served as industrial engineer for Carnegie-Illinois at Gary; as assistant plant industrial engineer for Continental Foundry & Machine Co., and as consulting engineer with Albert Ramond & Associates, Inc.

• **R. F. V. Stanton**, vice-president in charge of manufacturing of American Machine & Foundry Co., New York, has been elected a member of the company's board of directors. Mr. Stanton became associated with AMF as vice-president in charge of production in 1948, after more than 30 years with the Pratt & Whitney Div., Niles-Bement-Pond Co.

• **J. R. Thompson** has been named manager of flat belting, conveyor, elevator and transmission belting in the industrial products sales department of the B. F. Goodrich Co., Akron, Ohio. **Paul W. Van Orden** has been named manager of "V" belts and packing. Mr. Thompson has been with the company since 1930 and has served the last two years as manager of the Denver district of industrial products sales. Mr. Van Orden has been with Goodrich 21 years, all of which has been in belting sales and engineering.

• **Joseph M. Austin** has been elected to the board of directors of Oneida, Ltd., Oneida, N. Y. Mr. Austin is purchasing agent for the company.

• **C. W. Mills** has been appointed sales promotion manager for the northwestern district of the Westinghouse Electric Corp., with offices in Chicago, succeeding **C. A. Emery**, who has resigned. Mr. Mills formerly served the company in the advertising and sales promotion department in Pittsburgh. **F. E. Baker** has been made manager of the specialty transformer department in the transformer division at Sharon, Pa., succeeding **C. H. Bartlett**. Mr. Baker has been section engineering manager of the specialty transformer department since 1945. **Carl R. Busch** has been appointed district sales engineer for the lamp division's eastern district, with headquarters in New York.

• **W. B. Merriam** has been elected president of Globe Products Mfg. Co., Los Angeles. Mr. Merriam had previously served as executive vice-president. **R. E. Lockard** has been elected vice-president in charge of sales. Mr. Lockard had been sales manager for the past two years. **Thomas O'H. McArdle**, formerly with the Lynn Co., has been named to head the contract division.

• **Newman L. Smith** has been elected president of the Airquipment Co., Burbank, Calif., and of its wholly-owned subsidiary, Aerol Co., Inc. Mr. Smith, who is also a director of both companies, subsidiaries of Lockheed, succeeds **B. W. de Guichard**, who has retired. **Jack Newburn**, formerly superintendent of Lockheed's Constellation division, has been elected vice-president and general manager of Airquipment.

• **Norman Boudier, Howard F. Smalley, Robert Carpender and Melvin J. Faby** have been added to the research and development laboratories' staff of the Pemco Corp., Baltimore.

• **Albert F. Metz** has been elected president and general manager of the Okonite Co., Passaic, N. J. Mr. Metz, who previously served as vice-president and treasurer of the company, succeeds **Frank C. Jones**, who died recently. **Stephen A. Wilson**, the company's general counsel, has been elected a director and **Donald R. Stevens**, executive vice-president and a member of the executive committee.

• **R. W. Murphey** has been designated advertising manager, Taylor Forge & Pipe Works, Chicago. Mr. Murphey has had extensive industrial advertising experience and is well known in the Chicago area.

• **Louis R. Gaiennie** has been named director of personnel of Fairbanks, Morse & Co., Chicago. Mr. Gaiennie has his headquarters at the Beloit, Wis., plant of the company. He had formerly served as assistant to the vice-president of the Richardson Co.

• **Alvin A. Bergman** has been appointed manager of the New York office of Morse Twist Drill & Machine Co., New Bedford, Mass.



W. C. SCHADE, manager of product divisions, Olin Industries, Inc.

• **W. C. Schade** has been named manager of the product divisions of Olin Industries, Inc., East Alton, Ill. Prior to his appointment, Mr. Schade had been assistant to the president. He joined the corporation's sales department eight years ago.

• **Braden T. Woodside** has been promoted to superintendent of the Cambria Works of Harbison-Walker Refractories Co., Pittsburgh. Mr. Woodside joined Harbison-Walker in 1930.

• **Harry Sandsea** has retired as president and general manager of Anchor Tool & Die Co., Providence, formerly, Sandsea, Inc., and **Ross R. Harrison**, formerly president of New England Small Arms, has been elected chairman of the board and chief executive officer.

• **Sam S. Mullin**, executive vice-president in charge of operations, Cleveland Pneumatic Tool Co., has been named president of the company. Prior to joining Cleveland Pneumatic last June, Mr. Mullin had been general manager for administration of Textron, Inc.

• **Willis B. Clemmitt** has been elected vice-president of Freyn Engineering Co., Chicago. Mr. Clemmitt has been associated with the company since 1923 and has served for a number of years as chief engineer.



CHARLES M. WHEELER, general sales manager, Union Switch & Signal Co.

• **Charles M. Wheeler** has been appointed general sales manager of the Union Switch & Signal Co., with headquarters at Swissvale, Pa. Mr. Wheeler joined Union Switch and Signal in 1927 and since 1945 had been district manager at New York.

• **Harry H. Rose** has been named general manager of the Simmons Fastener Corp., Albany, N. Y. For the last two years Mr. Rose has been general sales manager of the company and for three years previous to that he served as sales engineer. Before his affiliation with Simmons Fastener, Mr. Rose had been engineer for the parent company, the Simmons Machine Tool Corp.

• **Paul F. Preston** has been appointed chemicals division manufacturing manager for the chemical department, General Electric Co., Pittsfield, Mass. Mr. Preston comes to General Electric from the Allied Chemical & Dye Corp., where he had been assistant to the Barrett Division's technical director since 1947.

• **Dan G. Caywood, Jr.**, has been appointed to represent George Haiss Mfg. Co., Inc., division of Pettibone Mulliken Corp., in the Massachusetts area and in all of Maine and New Hampshire.

• **Clyde B. Lynde** has been made vice-president and general manager of the insulation division of the Eagle-Picher Sales Co., Cincinnati. Mr. Lynde joined the Eagle-Picher Co. as Joplin insulation district manager and head of the insulation contracting department of the company in 1933. He served in both capacities for more than 10 years when he resigned to join Industrial Insulators, Inc.

• **Thomas E. Berry** has been named manager of domestic sales for All-State Welding Alloys Co., Inc., White Plains. Mr. Berry had formerly served as eastern seaboard regional sales manager for the company.

• **Eugene A. Lehmann** has been appointed vice-president and general manager of Globe Forge, Inc., Syracuse, a subsidiary of Barium Steel Corp., New York, succeeding **E. Lawton Bishop**, who has resigned. Mr. Lehmann had formerly been assistant manager in charge of the Melvindale plant of the Timken Detroit Axle Co.

• **Austin A. Kaiser** has resigned as vice-president and secretary of C. A. Roberts Co., Chicago. **Charles S. Roberts** has been named vice-president and **Charles S. Cline**, secretary and treasurer of the company. **Clarence T. Johnson** has been made Chicago district sales manager. Mr. Kaiser has been with the organization 33 years.

• **Lyman D. Warner** has been elected vice-president of the American District Steam Co., of North Tonawanda, N. Y. He had formerly been sales manager of the Crocker Wheeler Electric Mfg. Co.

• **H. L. Campbell** has recently joined the staff of the Precision Scientific Co. of Chicago. Since 1936 Mr. Campbell has been employed as metallurgical engineer chiefly at American Hoist & Derrick Co. of St. Paul and at the Western Foundry Co. of Chicago.

• **Albert C. Pitzonka** has been appointed sales manager of special tooling for the R. C. Neal Co., Inc., with headquarters in Buffalo. He formerly served as vice-president and sales manager of the J. R. Stewart Co.

• **Harrie T. Shea** has been elected president of the Star Electric Motor Co., Bloomfield, N. J., succeeding **Elvin E. Hallander**, who has been elected chairman of the board of directors. Mr. Shea has been active at Star as chairman of the executive committee of the board of directors.

• **Thomas K. Sherwood**, dean of engineering of Massachusetts Institute of Technology, and **Bruce S. Old**, of the staff of Arthur D. Little, Inc., Cambridge, Mass., were elected to the board of directors of the Little organization. **R. C. Griffin** has retired as director and assistant secretary.



SWAN E. BERGSTROM, vice-president, Cincinnati Milling Machine Co., whose appointment was recently announced in THE IRON AGE.

• **C. E. Scott** has been named manager of the unit heater and convector division of the U. S. Radiator Corp., Detroit. He had formerly served as vice-president of sales and advertising for the Rittling Corp., Buffalo, and manager of the industrial heating and commercial refrigeration divisions of the Fedders Mfg. Corp.

• **M. Dickinson** has been appointed a field service engineer for the Bassick Co., Bridgeport, Conn. Mr. Dickinson comes to Bassick from the Bureau of Aeronautics, U. S. Navy, where he headed development of equipment for handling and servicing aircraft.

• **H. G. Kronenwetter**, formerly advertising production manager for the radio division, has been appointed manager of advertising production for the lighting fixture, lamp, radio, electronics and international divisions of Sylvania Electric Products, Inc., New York.

• **George L. Chedsey** has been named supervisor of mining equipment, the Syntron Co., Homer City, Pa. **E. J. McIlvaine** has been appointed junior salesman in the vibratory material handling division of the St. Louis office; **John C. Mitchell** has been appointed to take over power tool sales in the Boston office; **A. C. Staley, Jr.**, has been named junior salesman in the vibratory material handling division of the Cleveland office. **E. J. Kirby, Jr.**, handles power tool sales in the Cleveland office.

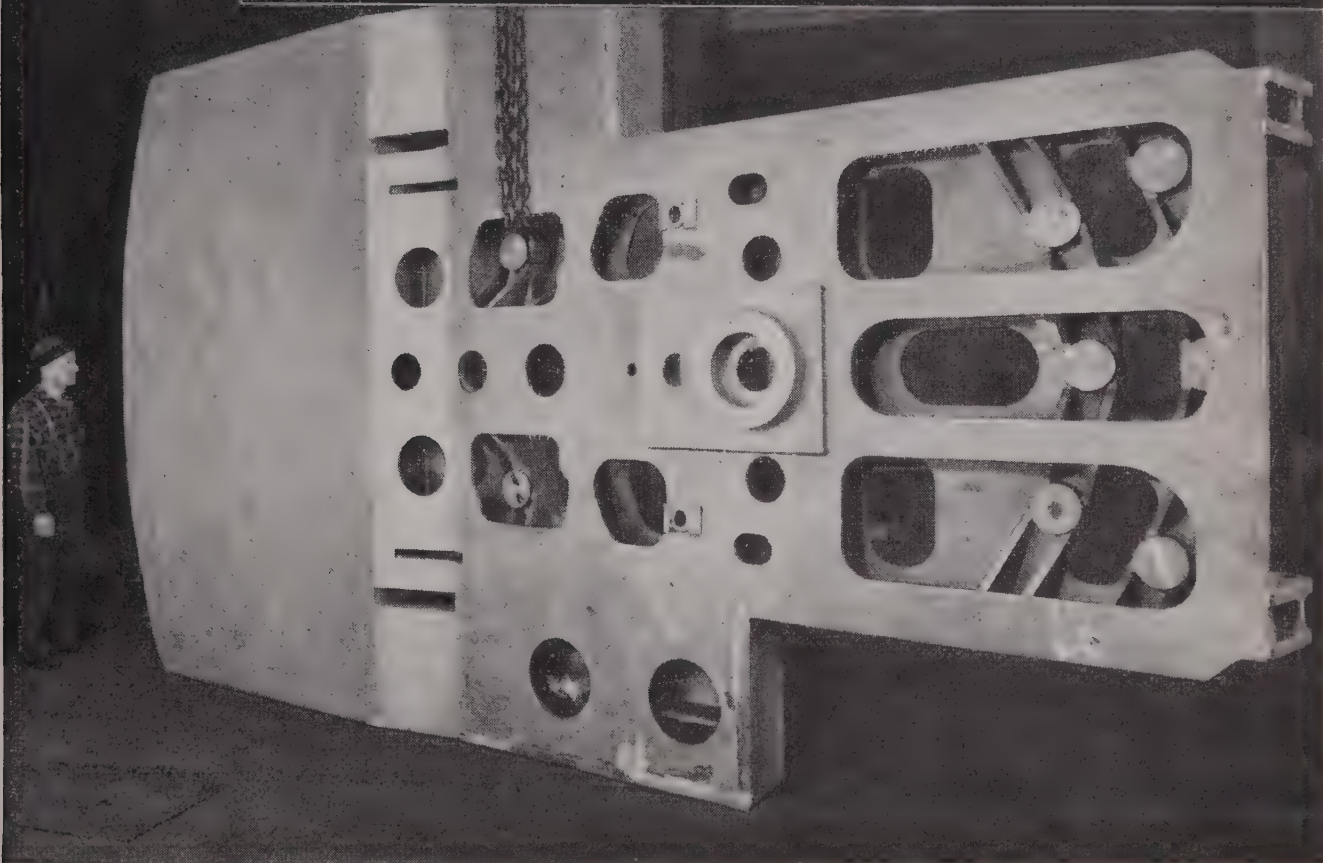
• **J. Gordon Collins** has been appointed to direct sales of new products as developed by the pigment division of National Lead Co., New York. Before joining National Lead, Mr. Collins had been associated with Michigan Chemical Corp.

• **Henry O. Farr** has been named production and technical director of the Murphy Paint Co., Ltd., Montreal, a Canadian affiliate of Pittsburgh Plate Glass Co., Pittsburgh. Dr. Farr has been associated with the paint division since 1936.

• **Robert P. Kenney**, formerly manager of the international sales department of B. F. Goodrich Chemical Co., Cleveland, has been appointed manager of chemical sales replacing **S. L. Brous**. **James C. Richards, Jr.**, formerly sales manager of Hycar American rubber and rubber chemicals, succeeds Mr. Kenney. **W. D. Parrish**, formerly technical service manager for Hycar and rubber chemicals, becomes sales manager of that department and is replaced as technical service manager by **Roger C. Bascom**, Hycar sales representative in the New England territory. **Roger S. Steller** has been appointed to replace Mr. Bascom in the New England area. Mr. Steller has been with Goodrich since 1942 and recently served the company in the sales service laboratory.

(CONTINUED ON PAGE 160)

Weldments by Graver



BASIC PLANNING FOR HEAVY MACHINES

Take this nine and one-half ton bed plate for a heavy-duty crane, for example. Sheared and flame-cut of steel plate, then joined through welding to become a rugged one-piece structure, it puts strength where strength is needed and eliminates useless weight.



In structures like this one . . . or in any machine base, press frame, large gear blank, engine base, housing or other heavy-duty unit . . . Graver weldments offer production economies that mean profits to you. Working to close tolerances, much final machining is eliminated. There are no pattern

expenses. Changes may be made at any time . . . during or after fabrication. Sub-assemblies and attachments may be welded, not bolted, to the structure. Web cross-sections may be reduced. Expensive materials may be used only for certain surfaces, the remainder being ordinary carbon steel. For single units or for production runs, these are the advantages of Graver weldments.

Write today. Get the details on Graver's complete design and fabricating facilities for all types of welded structures. Let Graver help you in your basic planning for heavy machines.

WELDMENTS DIVISION

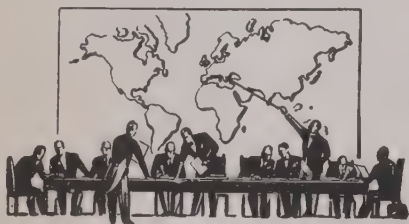
GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA

NEW YORK • PHILADELPHIA • CHICAGO • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.

European Letter . . .

• European confidence wavering in American foreign policy . . . Spirit of Atlantic Pact, not letter, will determine its value . . . America's willing defense of its European partners now only deterrent to war.



LONDON—After a period of rumor and counterrumor, Mr. Dean Acheson has intervened to assure America's allies that neither nation nor Congress is divided on the issue of the Atlantic Pact. On the contrary, there is general support for President Truman's definition of the Pact, in his Inaugural Address, as unmistakable proof of the joint determination of free countries to resist armed attack from any quarter. These reassurances were timely. European confidence in American foreign policy, which had been rising steadily for over a year, has recently been showing signs of bewilderment and hesitation. Three events were mainly responsible for this sudden doubt: the apparently fruitless visit to Washington of Mr. Lange, the Norwegian Foreign Minister, to discover the obligations and advantages entailed in the Atlantic Pact; the first debate on the Pact in the Senate, which retains its constitutional right to submit any treaty to the test of securing a two thirds majority; and the superficially unrelated pother caused by rumors that the United States was considering the withdrawal of its troops from Japan, on the argument that

the island would be a liability, not an asset, in the event of war.

The reaction to these three events has been a revival of the old deep-seated fear of instability in America's relations with the outside world. Mr. Lange's unfruitful attempt to secure information has drawn attention to the fact that information can hardly be given about a treaty which does not yet exist. This fact the critics take as a point of departure for arguing that the Pact may not come into effective existence at all since both Mr. Vandenberg, for the Republicans, and Mr. Connally, for the Administration, declared in the course of the Senate debate that, so long as Congress retains its right to declare war, no treaty can contain an automatic guarantee to go to war. From the Japanese incident the critics then extract proof that there is fundamentally no staying power in any American commitment. All these criticisms and inferences are mixed together, liberally dosed with Communist vinegar, and served up for the consideration of public opinion as a tacit and open plea that Europe should remain neutral between Russia and the United States. Why take sides, the insidious voices argue, when there is no guarantee that the Americans will stay the course? Is it not folly to risk Russian disapproval—as the

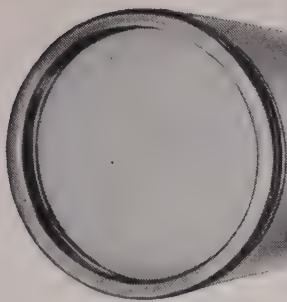
Reprinted from the London Economist by special permission.—Ed.

Norwegians have done—and receive nothing in return save the polite *non possumus* handed out to Mr. Lange in Washington? Have not the Swedes pursued a more sensible policy? Would not western Europe's interests be best served by following suit?

IT is perhaps hardly necessary in Britain to expose such suggestions for what they are—totally unrealistic except in serving the ends of Communist policy. Few voices in

this country will be raised in passionate pleas to make Britain a second Sweden. But in Europe, where Communist influence is stronger and political uncertainty is greater, it is essential that the rumors and the insinuations should be scotched at once. The suggestion that the vagaries of American policy call for European neutrality in reply is fantastically unreal. Neutrality is no answer to the type of danger which the nations of the Atlantic community are trying to stem. They have on their borders the toughest of all modern dictatorships, whose future intentions may be peaceful, but again may not—history on the whole supports the latter hypothesis. The neutrality of the weak excites and does not deter the potential aggressor. No aggressive dictatorship will be deterred from action because, say, a well-armed Sweden sits across its frontiers professing neutrality. The only deterrent is the knowledge that any act of aggression against any state, however small, will entail major war with an adversary comparable in size and military strength. Europeans should realize that they have to ask themselves one strategic question and one only: would America come to their assistance if Russia attacked them? The only known deterrent to war today lies in America's willingness to defend its European partners, if need be. Such is the simple issue underlying the Atlantic Pact. As a defensive instrument—and it is nothing else—it is of value simply because it secures American participation.

At this point the critics may argue from the Senate debate that American participation will not be secured by the Atlantic Pact, on the ground that this is precisely the commitment which the Senators are now excluding. Such criticism is hardly less unrealistic than the first. In this century no written obligation, no matter how solemn, can automatically insure the entry of



Spinning rings made by Pawtucket Spinning Ring Company of Central Falls, Rhode Island, being Homocarbured. Rings are formed either by forging or by automatic screw machine; after carburizing must be glass smooth with a .020"—.025" case and hardness of Rockwell 61C to 63C depending upon size of ring. Rings are not tempered; after leaving oil quench they are ready for polishing and shipment.



Parts Plant Saves Approximately \$60 Daily with Homocarb Heat Treatment

Savings of approximately \$60.00 per day, or about \$22,500.00 in 18 months, followed the adoption of the Homocarb Carburizing process by the Pawtucket Spinning Ring Company, Subsidiary of Saco-Lowell Shops of Biddeford, Maine.

Most of the savings come from elimination of rejections due to distortion, these rejections being previously of no value.

Additional savings are realized because of the small amount of time required to load rings into the Homocarb plus the reduced cost per pound over pack carburizing.

In the Homocarb process, the four factors which determine the success of the carburizing treatment are under perfect control at all times. Each piece of material in the furnace is exposed to the same quality and quantity of gas, for any desired temperature and length of time. Because of this identical treatment, a uniform case results, which can be duplicated by any heat treater, day after day.

Adoption of the Homocarb process has resulted in hundreds of plants in lower operating costs and a consistently uniform product. There is a Homocarb furnace to fit your operation. For further information, write for Catalog T-623, or if your problem is specific, an L&N engineer will be glad to call. Leeds & Northrup Company, 4956 Stenton Avenue, Philadelphia 44, Pa.



Note small space required for these 3 Homocarbs and quench. Equipment's compactness and clean operation often leads users to put it directly in the production line.



MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES

LEEDS & NORTHRUP CO.

any state into a war before it has been itself attacked. Dynastic wars might be conducted by contract; democratic wars go by emotion and spirit. A written guarantee will not compel a state if it is unwilling, as the Czechs discovered. Entry into war as the result of an alliance will not insure the readiness of a people to fight, as the Germans discovered with their Italian allies. Yet no written obligations brought the British Dominions from the ends of the earth to fight the same war twice in a generation. The formula written into the Atlantic Pact will not compel any government to enter a war automatically. Only despotic states can accept such obligations. But its provisions will establish the common links and interests of the signatories. It will further set in motion the strategic interweaving of their forces, the establishment of joint staffs, common planning and standardization of equipment, all of which will make joint action possible, should it ever become necessary. Such machinery was totally lacking before 1939. Its existence is in itself a guarantee of security and of effective defense.

IT is the spirit, not the letter, of the Atlantic Pact which will determine its value. At this point, criticisms of American policy in Europe are not only unrealistic, but grossly unfair. In the last three years America's dealings with Europe have been almost entirely admirable; they constitute a record in all history of generous and disinterested friendship. European stability and European recovery have been made the first priority of American foreign policy; money and effort have been freely devoted to the program of reconstruction. Can any honest observer doubt that this generous effort would be continued if the enemy of western Europe were no longer starvation and unemployment but the marching armies of Communism? In 1939, the British people came to the aid of Europe against Hitler, yet their record in the five or six years before the outbreak of war compares very unfavorably with American behavior since 1945. Britain was in many ways a disgruntled isolationist between 1933 and 1939; its incursions into Europe were few; as often as not, those that were made were for the purpose of making some deal with Hitler. Yet the

British did not fail when at last the attack came. Is it not reasonable, therefore, to place much more confidence in American policy today?

This is not a trivial issue. In this current storm in the Atlantic tea-cup, it can be argued that the reaction of some Europeans is far more serious than any sins of omission committed in Washington. At a time when opinion has been slightly bewildered by the uncertainties inseparable from the negotiation of an Atlantic Pact, it is painfully significant that no European statesman has thought fit to express roundly his confidence in American policy and his belief in the development of ever closer relations between the members of the Atlantic world. There is still a feeling of shyness, almost of shame, in referring to western Europe's total but not onerous dependence upon the United States. So much, it appears, sustained Left-wing propaganda has achieved. No one seems to have the courage to make an act of faith in the solidarity of the Atlantic community, not only as an instrument of present security but of future promise for mankind. And this fact is in itself dangerous, for if pacts are ultimately determined by the spirit of the peoples who engage in them, it cannot be left to America to provide all the effort and its partners all the criticism. There is need on both sides of the Atlantic for a declaration of faith and partnership—but the need is greater in Europe than in the United States.

THESE strictures on the European reaction to the present misunderstandings do not, however, absolve the American Government from all blame in the handling both of the Pact and of its general policy *vis-à-vis* its allies. Two points need careful consideration in the light of recent events. The first is the question of Allied consultation and the achievement of broad agreement over the whole field of foreign policy. The western Powers—the United States, western Europe and its colonies, and the British Commonwealth—have to realize that they face in Communism a worldwide menace to their ideals and interests which is largely, even if not wholly, directed from Moscow. The menace will not be met effectively

if it is countered piecemeal, here with one policy, there with another, and all of them canceling out. The shock felt in Australia and New Zealand at the rumors of a possible American withdrawal from Japan would not have been felt if there were genuine consultation on Pacific affairs. And there are other points where policies meet and clash, South East Asia, the Indian Ocean, and the Middle East are all regions in which joint consultation needs to be arranged on a much more systematic basis.

If general policies were more clearly in line, it would be possible to settle more effectively the second difficulty raised by recent events—the question of allocating scarce military and economic resources between various desirable strategic and military ends. The misunderstanding with Norway began when the State Department issued a statement that American war material would be available only to those who joined in the Atlantic Pact. This statement suggested a degree of agreement on the obligations of the Pact and on the proper distribution of resources which had certainly not been reached at that time and probably has not been achieved even today. Yet, until such questions are decided, it is premature for the Americans to refuse material to friendly powers and equally premature for those powers to assume that under no circumstances will they get any. The view expressed both in Washington and London that Norway need not make up its mind about the Atlantic Pact at once, is undoubtedly the right one. Meanwhile, Senator Connally, who helped to start the original uncertainty by his denial of automatic guarantees, appears to be in process of evolving a formula for the Pact which gives the nearest to a specific guarantee that a sovereign democracy can safely concede.

Today, and for many months to come, restraint on Russian actions will come, not from this or that article of a specific treaty, but from the Soviet Union's realization that aggression means atomic war. The right course for the western Powers at this point is publicly to reaffirm their solidarity and partnership and to continue detailed negotiations without delay and without fuss.

PLYMOUTH LOCOMOTIVE

Replaces Steam
For Yard Switching and Hauling



One year ago the 65-ton Plymouth Diesel Locomotive above replaced a steam locomotive in the plant yard of the Consumers Company, McCook, Illinois, producers of crushed stone. Operating on a 48 hour week it handles all of the track haulage and switching quicker and easier than before, having all the advantages of the diesel and none of the disadvantages of the steamer.

Compact and powerful this Plymouth Diesel spots cars when and where they are wanted. And it does the job economically, too—aver-

age diesel fuel oil consumption per an 8 hour day averaging 14 gallons.

According to officials of the Consumers Company it does a much more satisfactory job in much less time than the steam haulage formerly used and with a minimum of maintenance. If that's the kind of service you're looking for—dependable, economical, maintenance free haulage day in and day out—then you'll want to know more about Plymouth Locomotives. Write for free bulletin to Plymouth Locomotive Works, Dept. A-2, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES
GASOLINE, DIESEL, AND DIESEL ELECTRIC
PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

• **RAISE EXTRAS**—Bethlehem Steel Co. last week reported it had advanced size and pickling extras on hot rolled strip, effective Feb. 1, "to bring prices into line with earlier advances by other producers." The increase in size extras amounts to \$8 to \$10 a ton. Pickling increases are \$2 to \$3 a ton. Republic Steel Corp. raised hot rolled extras Nov. 15, and Armco raised them Dec. 20.

• **PRICING**—United Steelworkers have denounced both rigid basing point pricing and strict f.o.b. mill pricing now in operation in the steel industry. Instead, in testimony before the trade practices subcommittee of the Senate Interstate Commerce Committee, the union urged a moderate method under which individual companies could set up their own pricing systems, including such freight absorption as is necessary to meet competition.

• **FREIGHT CAR CUTS**—Predictions that big tonnages of plates, structural shapes and sheets earmarked for the freight car building and repair programs would be available to other steel users before June look sounder every week. Railroads generally have slashed into car repair programs with wholesale layoffs and their steel needs are being cut back. Western fruit crop failure has caused a 250-car order cancellation and an Eastern road in restudying a recent order may cut it by as much as 500 cars.

• **STEEL IMPORTS CLIMBING**—December imports of structural steel, at 35,000 tons, were some 10,000 tons more than total steel imports during November. Plate and sheet imports each topped 5000 tons while some 3000 tons of billets and 2600 tons of ingots, blooms and slabs were brought in. France, reviving fast, originated about 3200 tons of the total steel. Pig iron imports totaled 37,000 tons, much of it taken in through New England.

• **CRUCIBLE EXPANSION**—Crucible Steel Co. of America has completed its \$3 million expansion program at its Harrison, N. J., plant. The expanded plant, designated now as the Spaulding Works, includes both a cold rolling and a special products division.

• **LAYOFFS**—Manufacturing plants laid off 22 of every 1000 workers in December, according to the Bureau of Labor Statistics. This is the highest dismissal rate for the month since 1939. The ratio was 14 per 1000 in November.

• **ELECTRICAL SHEETS**—Price cuts on hot-rolled silicon sheets ranging from \$35 to \$50 were announced last week by Allegheny Ludlum Steel Corp., to bring prices closer to those of its principal competitors. The \$50 reductions bring A-L's prices down to those of Armco and Carnegie-Illinois, though transformer grades are \$40 a ton above those of these major competitors. New prices, in cents per lb, are: Electrical, 5.95; motor, 6.70; dynamo, 7.50; transformer 72, 10.05; transformer 65, 10.60; and transformer 58, 11.30.

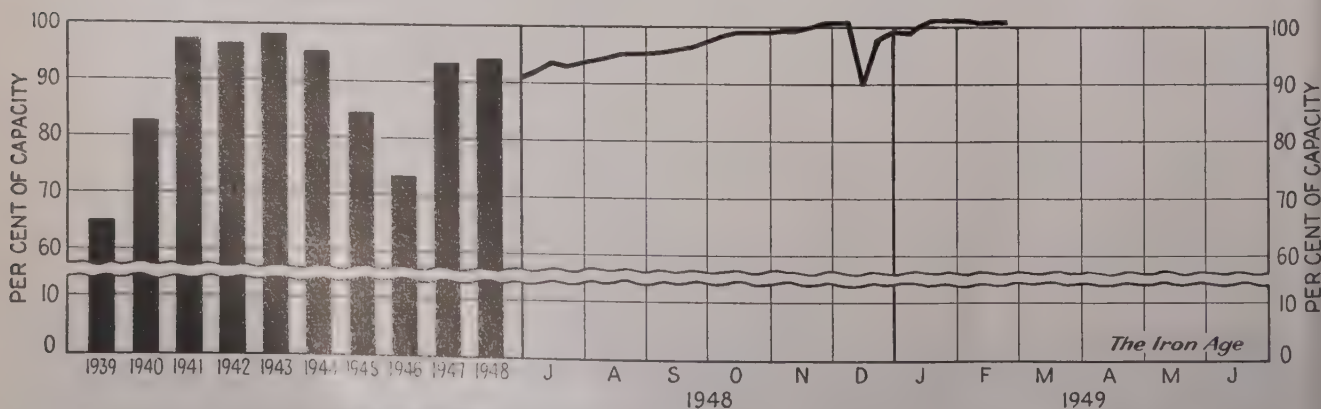
• **DISTRIBUTION CORRECTION**—Preliminary figures for Steel Distribution by Consuming Industries, THE IRON AGE, Jan. 6, 1949, p. 182, have been corrected. The revised table appears on p. 144, this issue. Due to an incomplete breakdown of "Construction and Maintenance" Products, some oil and gas tubing was included with that group instead of with "Oil, Gas, Water and Mining." Corrected figures show "Construction and Maintenance" for 1948 with 10,866,000 tons or 16.54 pct of the estimated 65,700,000 tons of finished steel shipments. "Oil, Gas, Water and Mining" is therefore estimated at 4,800,000 tons or 7.31 pct of total shipments.

• **WATCH COSTS**—Sears, Roebuck & Co., Chicago, have informed many of their suppliers of items made from steel, that Sears is no longer willing to consider manufacturing costs based on premium priced steel. Suppliers of domestic appliances, and other hard goods, have in the past been allowed to base their costs on high priced steel they were forced to secure on the gray market or through conversion. Although a few items have been excepted, the manufacturing costs on most metal goods now being sold to Sears must be based on mill price or regular warehouse prices.

• **NEW POWER**—Ohio Public Service Co. put a \$10 million addition to its generating plant here into operation Feb. 17. One of the chief customers of the enlarged power plant will be National Tube Co., U. S. Steel Corp. subsidiary, which has been awaiting the additional power for its new continuous seamless tube mill.

• **MANGANESE**—Offsetting rumors that Russia is shutting off manganese and chrome ore shipments to the United States, December imports of these strategic metals from USSR doubled over November, rising from \$1.4 million to \$2.7 million in value.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
February 15....	102.5*	100.0*	94.0	101.0	102.0	105.0	98.0*	101.0	105.0*	103.0	107.0	89.5	94.0	100.5*
February 22....	100.5	100.5	94.0	101.0	99.0	105.0	98.0	94.0	102.0	100.0	110.0	88.5	110.0	100.5

* Revised.

Industrial News Summary—

- **Raw Materials Outlook Is Good**
- **Six Month Record Output Seen**
- **Normal Market On Its Way Now**

THE outlook for raw materials used in steel-making is better this week than at anytime since the end of the war. No serious problems face the industry for the next several months. The industry is on its way to making an all-time 6 month record in steel output which will put the market in its best condition since the hysteria of steel shortage started a few years ago.

There are a few possible trouble spots but these will be ironed out long before they have any real effect on the outpouring of steel. It is more than a possibility that by the middle of this year talk of steel shortages will be down the drain. By that time there will be good demand. But there will be less and less of the pressure current in the past 2 years. There are unmistakable signs that the steel market is rapidly going towards balance.

But there are a few things that have helped the trend to normal that ordinarily would not be in the picture. The weather may have knocked the props out from under the West and Far West but it dealt a kindly deal to the East and Middle West. It is estimated that good weather in those areas has meant an added 1 million tons of steel over and above what would have resulted this year had the winter months been severe in the East and Midwest.

The increase in the amount of better coking coal—helped along by more and more coal washing—this year will mean an increase of 1½ million tons of steel ingots. So the weather and better coal can be credited with 2½ million tons of steel this year—or at least at that annual rate.

A close check of blast furnaces by THE IRON AGE shows that there are no major repair programs slated for some time. The number of new linings in the past few years have put blast furnace operations at a new high. This means that if foundry demand continues at a lower level steel firms will have more and more pig iron to use in openhearth furnaces. That is another way of saying that pig iron will be a factor in keeping the scrap market from rebounding to any great extent after the present declines level off.

NO steel firm is really short of scrap this week. Supplies are much better than they were 6 months ago. And in relation to the amount of scrap to be used the supply will be good for some months. Most large firms have been out of the market. That's one major reason why scrap prices have sagged.

When steel mills buy scrap again in large tonnages the price may advance but it will not regain the levels in effect before the decline set in. Scrap collections have been off in the past several weeks. But steel people are not worried about this situation. They now have ample supplies of pig iron to help them out. The scrap industry outdid itself last year in turning what looked like a serious bottleneck into a steady flow of useable scrap. The importation of scrap from abroad helped some but it was not the whole story.

Manganese ore and ferromanganese have the top spot on the list of raw materials that may give steelmakers some headaches. They are not alarmed about manganese ore. Imports from Africa and India are expected to improve and dependence on Russian ores will decline. There is a disposition in some quarters to let the Russians know that the steel industry can get along without them, just as it did during the war.

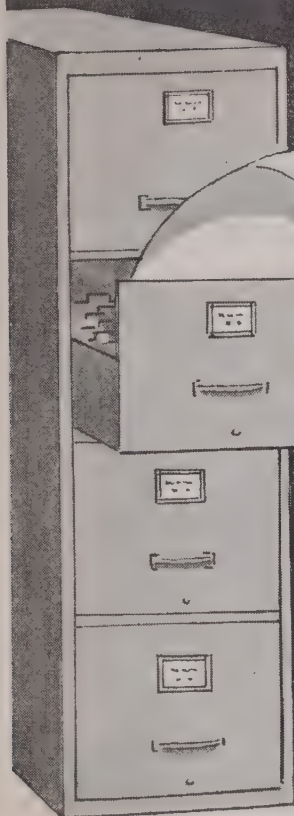
THERE may be a short period during which imports decline and call for greater withdrawals from industry stocks of manganese but steelmakers generally don't view this possibility with alarm. The ferromanganese situation, which is a blast furnace problem, is of somewhat more immediate concern. Furnaces now down or due to go down soon will mean continued tightness in this vital steelmaking ingredient. Steel companies that normally like to carry 60 to 90 days' supply will have to cut down their inventories to perhaps 30 days.

With the type cooperation now being shown among ferromanganese consumers its producers feel sure they can take care of all reasonable demands. They have foreseen current tight supply conditions for months and have worked out plans that virtually assure no interruptions to steelmaking on account of ferromanganese.

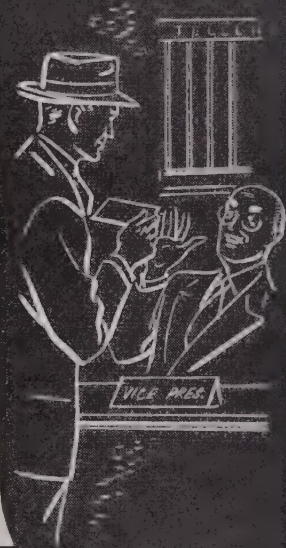
On the surface there is an indicated shortage of Lake ore boats at current steel operating rates. Raw materials men feel that this is a problem that can be licked when the time comes. They had been talking with the railroads about possibilities of big scale iron ore movements but these have been scaled down to almost nothing. The likelihood of an early start of Great Lakes shipping has brightened the ore supply picture.

The ingot rate this week is 100.5 pct of rated capacity, unchanged from last week's revised rate of 100.5.

"RELIANCE OK" .. P. A.

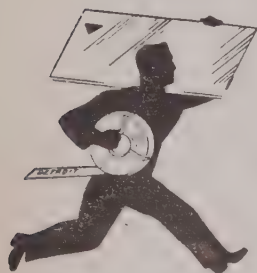


"We know you can't take a 'thank you' to the bank and borrow a dime on it, nevertheless we want to express our appreciation for services well rendered."



Quotation Reproduced From A Letter in Our Files

Steel Plentiful or Scarce . . Reliance Service Clicks with Sheet and Strip Steel Buyers



DEPENDABLE DAN
OUR CUSTOMERS' MAN

Here is Reliance Service in action from the P. A's angle . . . in his own words.

"We feel we have been given a fair share of materials . . ." "Your steel is preferred by the men in our shop" . . . "Your service far above the average warehouse in this area" . . . "Your timely assistance kept our plants operating" . . . "You have been doing everything possible under present conditions" . . . "In a pinch we can depend on Reliance coming through" . . . "You have gone all-out" . . . "You helped us out of a bad situation." . . . etc. . . . etc.

Reliance is constantly planning and working toward greater production and supply . . . towards higher standards of steel service.

**DETROIT
STEEL
CORPORATION**

PRODUCERS OF
COLD ROLLED STRIP STEEL

DETROIT 9, MICHIGAN
NEW HAVEN 7, CONNECTICUT

RELIANCE STEEL DIVISION

PROCESSORS AND DISTRIBUTORS JOB-FITTED SHEET AND STRIP STEEL

General Office: 1025 South Oakwood Ave., Detroit 25, Mich.

Plants: Chicago, Cleveland, Detroit, New Haven

Sales Offices: Grand Rapids, Indianapolis, Lansing, Mich.
New York, St. Louis, Toledo, Worcester

★ ★

Products: COLD ROLLED STRIP STEEL—Coils and Cut Lengths . . .
Slit or Round Edges . . . All Tempers . . . HOT ROLLED PICKLED
STRIP STEEL—Cut Lengths . . . SHEETS—Hot Rolled . . . Hot Rolled
Pickled . . . Cold Rolled . . . Long Terme . . . Galvanized.

Trend To Normal Market Again Spotlights Pricing Controversy

New York

• • • The closer the steel market comes to normal the more people will ponder over the f.o.b.-basing point controversy. Nothing will be done until the Supreme Court rules on clarification of the right of steel firms to absorb freight—if they want to—on a company basis.

The hundreds of thousands of words printed on the basing point argument have confused the issue for some people. The issue is clear and simple. Steel firms now do not care too much about returning to the old basing point arrangement in total. Nor are they frightened by selling f.o.b. mill. All they want is the legal right to compete. Or to put it their way—the right to absorb freight *if they want to*.

There is not much question of freight absorption when demand is greater than supply. But the time is coming—and it isn't far away—when surplus steel-producing areas will have to ship their steel into remote locations if they want to keep equipment rolling.

Under the f.o.b. setup now in vogue the consumer pays all the freight. Steel firms want the right to absorb freight—if it is not too much, and if they want the business. This way, say steel people, the country can avoid top output in one area and curtailment at another. It is unlikely that steel customers will pay *all* the freight to bring steel from a distant point when they can get it closer to home.

Certain features of the f.o.b. mill system of pricing are here to stay. Truck and water shipments have saved money for steel customers. They will not be abandoned even though the Supreme Court allows—at some future date—freight absorption. Nor will so-called phantom freight—freight charged but not incurred—be resurrected.

Some steel users see no difference between the pricing policy today and a few years ago. There are many customers who don't give a hoot whether steel is sold

Some Consumers Would Share The Absorption of Freight To Add Steel Sources

• • •

By TOM CAMPBELL
News-Markets Editor

• • •

on an f.o.b. or a basing point system. Nor do they care too much if the steel mills do or do not absorb freight. The reason for this? Their location.

Plants about halfway between

two steel centers which can supply their needs would pay the same price no matter what system is finally adopted. Under the basing point-freight absorption method they paid the base price plus freight from the basing point. Being halfway from two steel centers there was no absorption by steel firms; the full freight was paid by the consumer. Under f.o.b. they still pay the freight. So there is no difference.

The users who buy from two or three sources within or near the steel center pay the same total price, including freight. They are not too worried about what happens. When slim times come they can get all the steel they want at

The Bystander!



home. During tight times they had a better chance anyway because they were on the ground floor—assuming they had a buying history.

There are a lot of steel users who *have* been hit hard with elimination of freight absorption by steel firms—even though many steel companies pulled out of uneconomical areas long before f.o.b. became a fact. Steel users who are near a mill, but need more items than they can get must now pay the freight from distant steel plants. Before f.o.b. they paid only the freight from the nearest basing point. The additional freight has been a big item. If freight absorption is allowed they will not expect to pay all this extra money to get steel from distant mills—if competition is rife.

Then there is the case of the user who is some distance from his nearest supplier. This fellow always had to pay the freight from the mill nearest him no matter how far away he was. But when he could not get what he wanted, or when he felt that he wanted to have two or more sources, he could extend beyond the nearest mill knowing that *he could get the steel for the same price* as he paid to the nearest steel firm before freight absorption was eliminated.

That setup went out in many cases when freight rates and steel

costs became higher—long before the f.o.b. way of doing business was adopted. But not all steel firms threw freight absorption out the window a few years ago. Today the steel user who is far from his nearest source pays through the nose when he has to go farther to get his stuff.

There has been one big change in steel consumer thinking since the end of the war. Most of them no longer *want* to be dependent on one source for their steel, no matter what method of pricing is in vogue. This is not idle gossip. It is the firm opinion of many steel users who have talked privately to steelmakers in the past year. The number of casualties among steel users during time of tight supplies because of only one steel source is anything but small.

Out of this has come a willingness of some steel users, such as the auto people, to compromise, when and if the steel companies are again allowed to absorb freight in order to meet competition and keep their mills going. It would not be surprising to find some large steel customers willing to absorb a certain part of the freight themselves in order to be sure of more than one steel source. They say they never want to be caught again with only one source.

Some steel users have already

approached steel companies on the possibility of sharing freight absorption when and if it is made legal. But freight rates have climbed so high that many steel companies may not sell in remote centers because the absorption would be too high even though the customer did cooperate.

When and if steel firms are allowed to absorb freight in reaching remote areas—if they want to—the choices will look something like this: (1) They will ship and absorb the difference between the freight from their plant and the plant nearest the customer; (2) they will arrange that the customer will bear part of the absorption; (3) they will stay out of the market, or (4) they will build a plant in an area where they feel they should have part of the business. But if they do (4) they will probably eliminate a like amount of capacity in the area where they have a surplus of capacity.

If the Supreme Court makes freight absorption legal from an individual company standpoint without any connotation of conspiracy, all will be well and good. If it doesn't, then there is a hard fight ahead for legislation accompanied with the usual whipping boy tactics—steel being the whipping boy.

Orders Stainless Cars

Philadelphia

••• An order for 30 stainless steel suburban railroad cars has been placed by the Chicago, Burlington & Quincy Railroad for delivery in 1950, it has been announced by Fitzwilliams Sargent, vice-president of the Budd Co., here. The cars are part of an \$8.5 million program designed to modernize and dieselize suburban equipment announced by Ralph Budd, president of the Burlington Road.

The cars will be of a new design originated by the Budd Co. for a gallery-type two-level car carrying 148 passengers within the standard 85 ft car length. Car height is 15 ft, 8 in. to provide headroom for upper level passengers.



JOB FOR JUNIOR: The light weight of this Jones & Laughlin Junior Beam (9 lb per ft for a 10-in. beam) permits a man to carry one on his shoulder. Photo was made at the Homestead development, La Grange, Ill., which will consist of 366 four and five-room apartments.

Extension of Voluntary Allocations Won't Require More Steel

Washington

• • • Extension of the voluntary allocations law until Sept. 30, 1949, does not mean any substantial increase in the total steel required for the overall program, according to the Office of Industry Cooperation.

A recent tabulation made available to THE IRON AGE by OIC director, Earl W. Clark, reveals that the 14 programs which will continue beyond Feb. 28 will require 9.74 pct of the total steel output. The diversion resulting from these programs, that is the amount of extra steel going to the various industries as a result of the voluntary set-up is estimated at only 3.23 pct of total output. New programs under consideration at the present time are not expected to increase the total take to more than about 10.5 pct of total production and diversion is not expected to go above 4 pct.

With steel supplies easing slightly, OIC's plans call for cut-backs in allocations to a few industries, possible elimination of others, and a few new programs.

Prospective new programs now under consideration by OIC include:

Foreign relief—The Economic Cooperation Administration plans to approve the export of about 900,000 tons of steel during 1949, as compared with 1,250,000 tons last year. Steel plate accounts for slightly more than 25 pct of the total. ECA feels that it will need a voluntary program for about one-half to two-thirds of the total.

Housing—OIC is currently making an overall study of steel requirements for housing. The monthly allocation of 31,622 tons for warm air heating equipment expires on Feb. 28. This program will probably be permitted to lapse for a month and put into operation again on Apr. 1. The new program will call for a smaller tonnage of steel. It is hoped that the reduction in tonnage for this purpose will provide sufficient steel for programs for baseboard radiation, steel doors and bucks and rain carrying equipment.

There has also been a cut-back in the steel allocation for all-steel prefabricated houses due largely to the fact

OIC Estimates Steel Diverted By the Program At Only 3.23 Pct of Output

o o o

that only two of the larger firms appear to be making the grade. The cut-back amounted to 6633 tons which brings the total allocation down to 46,782 tons instead of the original 53,415.

Distressed municipalities—There has been considerable pressure from Congress for a steel allocation for this purpose. OIC is currently thinking about an omnibus voluntary agreement, which would not specify any tonnage requirement to meet this need. However, a program will not be presented to the steel industry until definitive criteria are worked out.

There is also a possibility that a small amount of steel will be requested to complete several government reclamation projects. In addition, the military allotment of 102,505 tons probably will be increased.

OIC is also exploring the aluminum situation but realizes that any program in this field would have to be concerned with increasing the supply of aluminum rather than the distribution of existing production.

A voluntary program for replacement rail has been sidetracked. At a meeting of steel and railroad offi-

cials several weeks ago, it was determined that estimated 1949 output of 1,811,000 tons as compared with last year's production of 1,630,000 tons would take care of the urgent needs for replacement rail.

OIC is also satisfied with the progress of the freight car program. January production amounted to 8950 cars with only 593 new cars being ordered during that month.

The diversion estimates for 1949 presented in the accompanying table are based on output for the year of 68 million tons. Actual diversion of steel tonnage from Apr. 1, 1948 to Feb. 28, 1949, was 1,264,903 or 2.09 pct of total output. The product estimates shown in the table are based on the following 14 programs which are scheduled for continuation beyond Feb. 28:

	Monthly Allocation
Warm air heating equipment.....	31,622
Freight cars	249,682
Oil field tanks and production equipment	18,530
Barges	25,000
Tankers	40,280
Anthracite coal industry	3,130
National military establishment....	102,505
Atomic Energy Commission	16,414
NACA	1,926
Merchant vessels	15,415
Mining machinery	31,785
Ore cars	2,192
Gas pipe line for AEC.....	4,750
Farm grain bins	8,400
TOTAL	551,731

In addition, OIC estimates that the diversion in the foundry pig iron program for housing purposes amounts to 20,792 tons or 4.52 pct of total output.

VOLUNTARY ALLOCATIONS PROGRAM
Total Steel Requirements and Estimated Diversion

Steel Product	Total Tonnage Under Voluntary Allocations Plan		Estimated Receipts Without Voluntary Allocations Program	Estimated Monthly Average Net Diversions	
	Tonnage	Pct. of Prod.		Tonnage	Pct. of Prod.
Bars, hot rolled, incl. concrete reinf.	67,796	8.30	45,694	22,102	2.70
Bars, cold finished	6,685	5.03	5,061	1,624	1.22
Structural shapes, incl. piling	88,403	24.22	60,819	27,584	7.58
Plates	210,639	33.17	142,746	67,893	10.89
Sheets and strip, hot rolled	65,890	8.15	54,393	11,497	1.42
Sheets and strip, cold rolled	10,905	1.43	8,032	4,873	.64
Sheets and strip, coated	26,484	18.39	13,874	12,610	8.76
Pipe and tubes, ex. petr. line pipe and oil country goods	26,856	9.16	15,477	11,379	3.84
Line pipe	4,750	2.60	4,750	2,800	2.80
Rails and accessories	3,512	1.39	1,081	2,431	.96
Axles, wheels, and semi-finished	35,215	10.84	20,901	14,314	4.40
Tin plate andterne plate	330	.10	200	130	.04
Wire and wire products, ex. bale ties	4,465	1.13	2,528	1,937	.55
TOTAL	551,731	9.74	368,807	182,924	3.23

SOURCE: Dept. of Commerce.

Industrial Briefs . . .

• **NEW COMPANY**—Harold Buckholdt and Gilbert Reed formerly metallurgical engineer and heat treat engineer, respectively, with Allis-Chalmers Mfg. Co., have announced the formation of Reed-Buckholdt, Inc. in Springfield, Ill. The firm will specialize in tool heat treating and will give complete metallurgical service.

• **SERVICE DIVISION** — Scully-Jones & Co., Chicago, production tool manufacturers, have announced the formation of an Engineering and Design Div. The new division will offer help regarding operational procedure; methods, engineering and processing; tool and machine design.

• **OPENS NEW OFFICE** — The Metalwash Machinery Corp., Irvington, N. J., has announced the opening of its new Michigan office at 6432 Cass Ave., Detroit. Webb L. Nimick will be in charge of this office.

• **DISTRIBUTER** — Kasle Steel Corp., Detroit, has been appointed as aluminum distributor in the Michigan area by Reynolds Metals Co., Aluminum Sales Div.

• **BRANCH OFFICES**—Pittsburgh Steel Products Co. has opened a district sales office in Dallas at 3908 Hawick Lane, with Gilvert H. Coughlin as manager. A Pacific Coast sales office has been established at 755 Monadnock Bldg., San Francisco, comprising the Los Angeles and San Francisco offices. James A. Old was appointed district manager.

• **MOVES** — The Philadelphia branch sales office of Syntrol Co., Homer City, Pa., has moved to 1018-20 W. Lehigh Ave. The Kansas City office has been moved to the Wirthman Bldg., 31st at Troost Ave.

• **PURCHASE**—Dr. Haig Solakian, president of the Crown Chemical Corp. of Guilford, Conn., has announced the purchase of the Bellis Heat Treating Co., Branford, Conn., heat-treating salt bath and furnace equipment. Bellis will continue to operate as a separate entity.

• **BRAZILIAN AGENT**—The Dorr Co., New York, engineers, have appointed Sociedade Tecnica e Comercial Serva Ribeiro S. A., Sao Paulo, Brazil, their exclusive representative in that country for all Dorr equipment and technical services used in the chemical, metallurgical, industrial and sanitation fields.

• **ELECT OFFICERS**—Joseph P. Crosby, vice-president and sales manager of the Lapoint Machine Tool Co., Hudson, Mass., has been elected chairman of the Boston chapter of the American Society of Tool Engineers. Others elected include A. J. Leone, first vice-chairman; Prof. Prescott A. Smith, second vice-chairman; Karl G. Nowak, secretary; and Wilfred B. Wells, treasurer.

• **SALES AGENT** — American Cladmetals Co., Carnegie, Pa., has announced the appointment of the Pacific Metals Co., Ltd., as the exclusive sales agents of its cladmetals in California, Arizona, Nevada and Utah.

• **EASTERN OUTLET**—Hyster C., Portland, Ore., has appointed McCall-Boykin Co., Inc., Baltimore, as distributor of its lift trucks, straddle trucks and mobile cranes in the vicinity of Baltimore.

• **NEW LOCATION**—The Liberty Smelting Co. has announced the opening of their new office and warehouse at 1525-31 N. American St., Philadelphia. The company will specialize in the handling of all brass mill material for direct mill shipment.

German Scrap Shipments Rise Sharply in January

Washington

• • • Shipments of iron and steel scrap from Germany to the United States amounted to 150,270 tons in January, according to the Office of Industry Cooperation. The total is 42 pct higher than the December shipments of 105,524 tons and is 85 pct higher than November shipments of 80,709 tons.

The OIC also reported that the Joint Export Import Agency in the Bizonal area had adjusted freight differentials applying to exports of ferrous scrap from certain German inland waterway ports. The differentials range from \$2 to \$3 a ton and are deductible from the established prices of \$28.50 for steel scrap and \$45.50 for cast iron scrap.

The inland ports affected and their differentials follow: Duisberg, \$2; Dusseldorf, \$2.20; Cologne, \$2.30; Bonn, \$2.35; Mainz, \$2.40; Mannheim, \$2.50; Frankfurt, \$2.60; Karlsruhe, \$2.70; and Heilbronn, \$3.

Effective Feb. 4, the differentials apply to all future scrap metal contracts which call for delivery of tonnages (free alongside ship) German inland waterway ports and to contracts on which deliveries have not begun.

OIC explained that the change in differentials was based upon changes in existing transportation and loading costs.

The January shipments included 39,369 tons of Army generated scrap and 110,901 tons of commercial scrap. Scrap shipments from Germany to the United States from July 1948 through January 1949 totaled 500,036 tons. Postwar shipments prior to July 1948 only amounted to 4000 tons. Of the total tonnage of scrap allocated to the U. S. 340,000 tons of commercial scrap and 101,000 tons of Army scrap are still to be shipped.

Acquires Valve Plant

Minneapolis

• • • Minneapolis-Honeywell Regulator Co. has acquired the 113-year-old H. Belfield Co., Philadelphia, manufacturers of automotive valve controls.

Canadian Steel Output Hits All-Time High In 12-Month Work Period

Toronto

• • • Canadian production of steel ingots and castings rose to a new all-time high in 1948, totaling 3,201,656 net tons. This compares with the former record made in 1944 when output totalled 3,024,978 net tons.

Production of pig iron and ferro-alloys also made new all-time records. The former totalled 2,120,909 net tons and the latter 250,659 net tons. The previous record for pig iron was in 1947 when 1,969,847 tons were produced. The former record for ferro-alloys was made in 1945 when output totalled 186,978 tons.

Following are the monthly production figures for 1948 in net tons:

	STEEL INGOTS	CASTINGS
January	247,768	8,958
February	230,183	9,463
March	275,349	10,677
April	254,315	9,951
May	279,688	9,879
June	249,710	9,655
July	238,104	6,768
August	254,362	8,692
September	248,622	9,243
October	272,127	9,739
November	267,671	10,807
December	271,128	9,297
Total 1948	3,089,027	112,629
Total 1947	2,854,532	90,634
Total 1946	2,253,437	81,194

	PIG IRON	FERRO-ALLOYS
January	160,042	17,127
February	151,128	11,823
March	172,675	14,293
April	170,785	14,474
May	193,305	18,436
June	183,763	13,502
July	187,940	12,939
August	191,383	12,700
September	182,465	12,318
October	186,424	19,489
November	166,771	17,594
December	174,233	23,709
Total 1948	2,120,909	250,659
Total 1947	1,969,847	149,832
Total 1946	1,403,758	116,995

Buffalo Forge Dividend

Buffalo

• • • The Buffalo Forge Co. has declared a dividend of 45 cents a share on the common stock, payable Feb. 28 to holders of record Feb. 18. A similar dividend was declared at this time last year.

Aluminum Assn. Officers

Cleveland

• • • Aluminum Assn. elected R. S. Reynolds, Jr., Reynolds Metals Co., Richmond, Va., president of the association. Vice presidents elected were: George N.

Wright, sales manager, John Harsch Bronze Foundry Co., Cleveland, E. G. Grundstrom, Advance Aluminum Casting Corp., Chicago, and M. E. Rosenthal, United Smelting & Aluminum Co., Inc., New Haven.

Reports Profit Increase

Cleveland

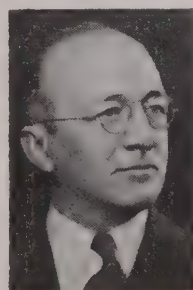
• • • Electric Controller & Mfg. Co. has reported net profit for 1948 of \$1,397,572, an all-time high, equal to \$19.72 a share compared with \$1,288,428 or \$18.18 a share in 1947.

R. G. Widdows, president, attributed the good showing to continued expansion in the heavy industries, particularly those producing iron, steel, nonferrous metals, oil and transportation equipment, which created heavy demands for the company's products.

Receives Doctor Degree

Middletown, Ohio

• • • Alexander L. Feild, associate director of research, Armco Steel Corp., was recently awarded



A. L. Feild

an Honorary Degree of Doctor of Science by the Stevens Institute of Technology, Hoboken, N. J. Dr. Feild was born and educated in North Carolina. He has degrees from the University of North

Carolina and from North Carolina State College. A year after receiving his first degree he entered the employ of the State Agricultural Dept., where he served for seven years. After that he was with the U. S. Bureau of Mines as a chemist and metallurgist.

For the past 30 years he has been a research man in industry. During this time he has been awarded 28 U. S. patents. Eight others are now in process of prosecution. He is the author of 37 papers and reports, many of them in his special field of stainless steel. At Armco he is now in charge of stainless steel and high temperature alloy research.

Tool and Die Firms Seek Ways to Lower Costs of Retooling

Detroit

• • • If automotive tooling costs are too high, Detroit tool and die firms want to know the amount of the postwar increase, what factors have contributed to this increase and what can be done about it.

In an unprecedented move in Detroit recently an off-the-record panel discussion was held in which representatives of leading tool users and tool makers exchanged information about postwar tooling. Suggestions were offered at the meeting that, it is expected, will lead to a better understanding of each others problems.

The meeting to discuss these problems was arranged by the Automotive Tool & Die Mfrs. Assn. Frank Rising, of Automotive & Aviation Parts Mfrs., Inc., served as moderator.

Among the questions discussed were comparative tooling costs in the prewar and postwar periods and possible avenues of cost reduction that might be followed by either the tool maker or the tool user.

During the discussion it was brought out that in many instances auto plant tooling is growing more complex. Also, in most applications, the new tools are expected to make possible a substantial increase in hourly production.

In addition to producing more parts per hour, it is expected that modern tools will produce higher quality parts requiring less metal finishing. These features, in addition to the requirements for greater automaticity and the rising cost of labor and materials, have accounted for the rise in tooling costs since the war, according to Detroit tool suppliers.

The discussion developed the information that die tryout has become a difficult problem for both the tool user and the supplier. Because of the short model change-over period, an auto plant has little opportunity to try out its new dies. Also, with steel in short supply, it is often impossible to make long finishing runs of parts, thereby permitting the use of production presses for die tryout.

Chances for Congressional Approval of St. Lawrence

Washington

• • • That hardy perennial, the St. Lawrence Seaway project, kicked around since 1897, is once again coming up for debate in Congress. The chances for approval by the 81st Congress are brighter than at any time in recent years, but do not yet appear good enough to make it a sure thing for 1949.

Opposition has been melting away in some quarters, such as segments of the iron ore and steel industries, which in turn has influenced a few key members of Congress, but the die-hard opponents from the Eastern port areas, the Gulf Coast, New England, the coal producing states, and the railroads and their allied interests are still a potent force, with strong supporters in Congress.

Illustrating the trend of thought in Washington, an IRON AGE check of some of the project's closest supporters reveals guarded optimism, but still no assurance of enough votes to push the project through Congress.

The legislation before the 81st Congress is similar to that which was considered by the last Congress. It still calls for a project which would be self-liquidating and self-supporting by means of toll charges. The toll charges could not exceed \$1.25 per short ton.

About 90 pct of the Seaway is already complete (see accompanying map), but the canal system now in operation restricts navigation to small vessels of 14-foot maximum draft. The completed Seaway will establish a minimum depth of 27-feet over the entire route from Duluth to the Gulf of St. Lawrence. The channel from the ocean to Montreal is now at a minimum depth of 35 feet.

Some of the opposition to the project has centered around the 27-foot maximum depth, which would prevent large ocean-going vessels, such as ore carriers on the South American run, from utilizing the Seaway, necessitating transshipment at Montreal or other ports on the lower St. Lawrence. Its supporters point out, however, that transshipment expenses for bulk commodities, such as ore, coal, grain and petroleum, are comparatively small and the 27-foot channel is accordingly not regarded as a serious obstacle. They further emphasize that all of the locks will be 30 feet in depth, and it would be a relatively easy matter to convert the entire project to this depth at some future time.

A Senate Foreign Relations Committee report due to be released within the next few weeks will present cost estimates and other data on deeper channels of

30 and 35 feet, respectively. In any case, all of the groundwork in the United States and Canada has been based on a 27-foot channel, and if this were to be changed now it would set the project back at least a half dozen years.

The latest published cost figures for the 27-foot project are those of May 1947 presented by the Senate Foreign Relations Committee. These figures indicate that an additional \$720 million is needed to finish the job, \$492 million from the United States and \$228 million from Canada.

(Editor's Note: For a detailed discussion of these cost estimates, see THE IRON AGE, Jan. 6, p. 237). Committee experts told THE IRON AGE that the only changes in these estimates would be those reflecting price and wage movements.

The Seaway project, as presently contemplated, would require about 5 years to complete and would take large amounts of labor and materials. It is estimated that direct and indirect labor on site and among suppliers would be about 20,000 a year, and the materials required would consist, among others, of 100,000 tons of reinforcing steel and rails, and 100,000 tons of structural and miscellaneous steel for both the United States and Canada combined, in addition to some 700,000 tons of cement and 84 million board feet of lumber.

As to the power production as a result of the Seaway, the Corps of Engineers and the Federal Power Commission at various Congressional hearings have reported that the St. Lawrence development will make possible the production of 12.6 billion kilowatt-hours of hydroelectric energy a year. One half of this output would go to the United States.

One of the major factors which has given some hope to supporters of the project is the growing realization that the United States may soon become increasingly dependent on foreign sources of iron ore, principally Labrador, Quebec, and South America.

For this reason Commerce Dept. transportation experts say that "it is almost a certainty that a huge traffic in iron ore will develop."

Commodity	Potential Traffic	Toll Charges Per Short Ton	Total Revenue
Iron ore.....	30-37½ million tons	\$.50	\$15,000,000-\$18,750,000
Grain.....	6½-11½ million tons	.25-.35	1,625,000- 4,025,000
Coal.....	4 million tons	.25-.35	1,000,000- 1,400,000
Petroleum.....	6-20 million tons	.25	1,500,000- 5,000,000
Agricultural machinery.....	48 thousand tons	1.25	60,000- 60,000
Automobiles, parts and accessories.....	640 thousand tons	1.25	800,000- 800,000
Iron and steel.....	1,371 thousand tons	1.25	1,713,750- 1,713,750
Office appliances and parts.....	7 thousand tons	1.25	8,750- 8,750
Wheat flour.....	555 thousand tons	.50	277,500- 277,500
Industrial chemicals.....	13 thousand tons	1.25	16,250- 16,250
Coffee.....	245 thousand tons	1.25	306,250- 306,250
Sugar.....	963 thousand tons	1.25	1,203,750- 1,203,750
Oil seeds.....	125 thousand tons	1.25	156,250- 156,250
Wool, unmanufactured.....	6 thousand tons	1.25	7,500- 7,500
Newsprint paper.....	121 thousand tons	1.25	151,250- 151,250
Manganese, chrome, and ferro-alloy ores and metals, n.e.s.....	240 thousand tons	.50	120,000- 120,000
Copper, refined and unrefined.....	34 thousand tons	1.25	42,500- 42,500
Nitrogenous fertilizer materials.....	25 thousand tons	1.25	31,250- 31,250
Residual general cargo traffic.....	6,885 thousand tons	1.25	8,606,250- 8,606,250
Ballast shipping.....	25½-42 million dead- weight tons	.75 per deadweight ton	3,825,000- 6,300,000
TOTAL.....			\$36,451,250-\$48,976,250

Source: Transportation Division, Dept. of Commerce.

Seaway Project Brightest in 52 Years

By GENE HARDY
Washington Editor

In a report issued more than a year ago, and authored by Paul M. Zeis, Chief of the Department's Transportation Division, it is estimated that the maximum volume of ore that could be handled by the Seaway is somewhere between 30 million and 37 million tons annually, compared with the 80 to 90 million ton requirement of the

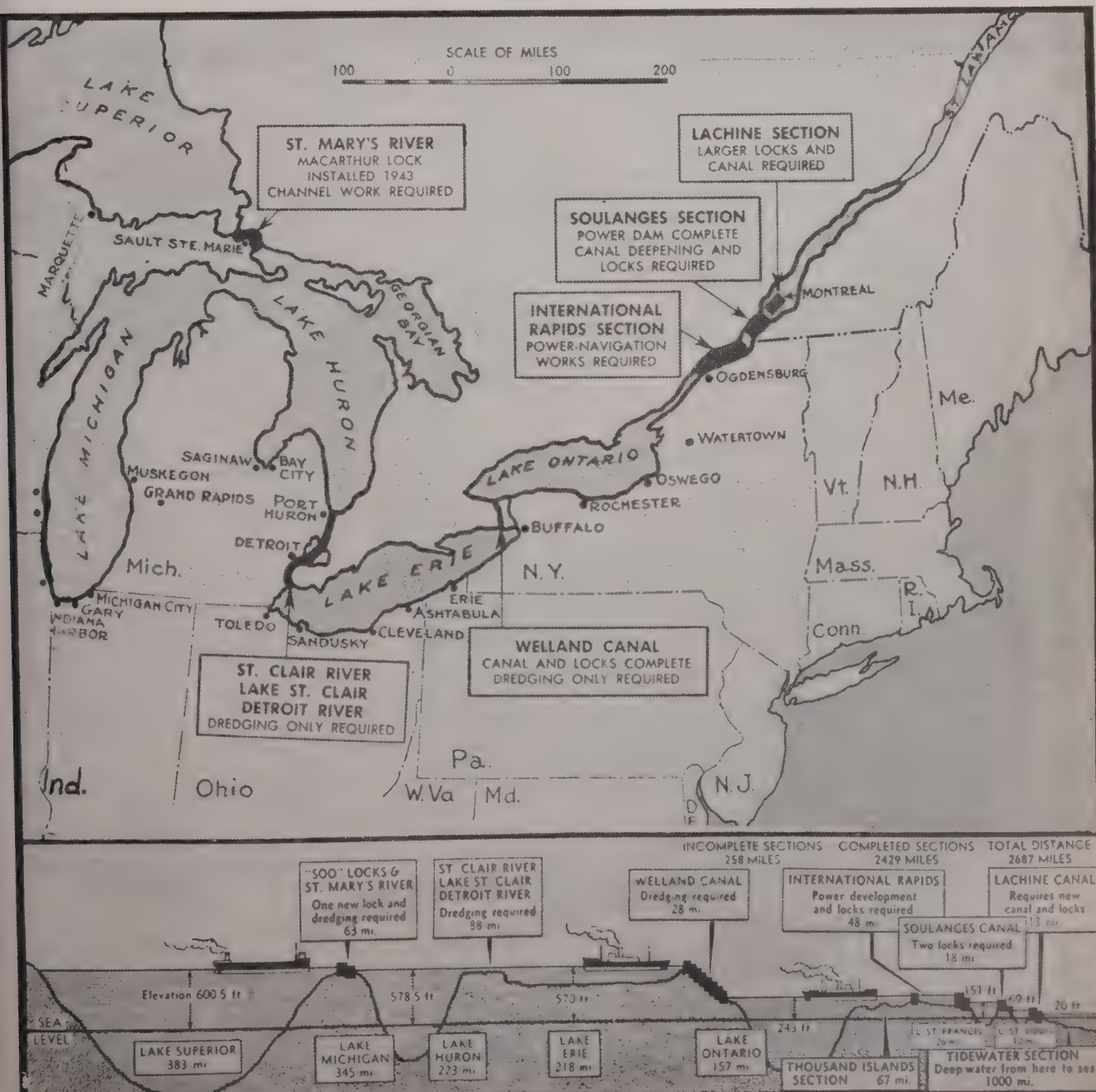
lakes steel industry during good years. (See THE IRON AGE, p. 100, Dec. 4, 1947.)

In its most recent report, completed shortly before the end of 1948, the Transportation Div. states that recent developments with respect to iron ore "suggest that the volume of traffic predicted in the (earlier) report was excep-

tionally conservative. Likewise, recent increase in rail rates have increased rather than decreased the transportation savings which would be possible," by moving iron ore through the Seaway.

As to the capacity of the projected Seaway for handling large quantities of iron ore, the Commerce Dept. study emphasizes it

● Current status of the St. Lawrence Seaway



SOURCE: Dept. of Commerce and New York Power Authority.

is limited by the capacity of the Welland Canal locks, which, for a navigation season of 240 days, can handle about 6800 large vessel passages—3400 in each direction.

Since the Seaway will handle other types of traffic, it is estimated that the maximum number of ore boats which the Welland Canal can be expected to handle is probably in the neighborhood of 2000 and not in excess of 2500.

If the Labrador-Quebec deposits are used extensively, the type of ore carriers utilizing the Seaway will be vessels comparable to the present lake carriers. Accordingly, the volume of ore which could be handled in from 2000 to 2500 vessel passages ranges from 30 million to 37.5 million tons, provided the largest type ore carriers—handling upwards of 15,000 tons, are used.

It will be noted that the potential traffic in ore, coal, and petroleum amounts to somewhere between 40 million and 53.5 million tons annually. This tonnage could be handled by the Seaway, according to the Commerce Dept., and substantial quantities would begin moving through the Seaway shortly after completion.

Adding the Department's recent general cargo traffic estimates to the estimates on the four major bulk commodities it will be noted that the overall traffic potential is somewhere between 57 million and 84 million tons.

A complete tabulation of the estimates on general cargo as well as bulk traffic are presented in Table 1.

The tabulation of suggested toll charges was not designed to set up any recommended range of charges, but was used by the Commerce Dept. to give some indication concerning the feasibility of liquidating the cost of the Seaway project through the collection of tolls. It will be noted (Table 1) that the bulk commodities carry a lower toll charge than the \$1.25 specified in the legislation. On the basis of the anticipated traffic and suggested toll charges, toll revenue would range between \$36,351,250 and \$8,976,250 per year, an amount more than adequate to amortize the cost of the transportation features of the project even if it proves necessary to provide duplicate locks to accommodate the volume of traffic.

Building Activity Dips In New England States

Boston

• • • Investment commitments for building and heavy engineering projects in New England in January declined 30 pct from December and were down 7 pct from January of last year according to James A. Harding, district manager of the F. W. Dodge Corp.

Exceptions to the lower investment volume were noted in contracts awarded for non residential building in January with increases reported of 7 pct over December and 4 pct over January a year ago. Commercial buildings, hospitals and institutions, and church building showed sharp advances over December and over January of last year to continue the marked uptrend in these classifications.

The total building and construction volume of \$27,670,000 in January, reflected a sharp drop in heavy engineering awards and a 45 pct decline in residential contracts from December.

Ford Named Fashion Car

Detroit

• • • The current Ford program to design cars that appeal especially to women is earning dividends. The Fashion Academy award of America's "Fashion Car of the Year" has been given to the 1949 Ford. The Fashion Academy annually selects "America's Best Dressed Woman." The award will be presented to the company in conjunction with the selection of America's "Best Dressed Woman" for 1949.

Will Spend \$90 Million

Ottawa

• • • Canadian Pacific Railway proposes to spend \$90 million a year over the next 5 years, L. B. Unwin, vice-president, told the Board of Transportation commissioners.

Of the above amount \$22 million a year will be met from depreciation resources and the company hopes to get \$15,235,000 a year of the remaining amount as surplus under a board declaration last year. The balance of \$52,100,000 would have to be raised by the issuance of new capital stock and fixed interest securities.

POLES, NORTH AND SOUTH: Shown here are the 170-in. poles of the cyclotron now being erected at the University of Chicago. This atom smasher will make available an energy of 400 million electron volts which will speed the "atomic bullets" at 150,000 miles per second, close to the speed of light.



Openhearth Grade Iron Ore Proved In Liberia; American Companies Show Interest

New York

• • • Over 20 million tons of open-hearth grade iron ore that assays between 68 and 70 pct iron has been proved in Liberia, 40 miles from the Port of Monrovia. The deposit contains lump ore in the form of a cropping that rises 150 ft out of the ground and extends for about half a mile.

Eventually there may be two, three or more times as much of the high grade ore there. Reserve of the blast furnace grade is even greater. Enough work has not been done to determine completely the scope of this reserve. However, enough work has been done to indicate its possibilities.

Mineral rights to 3 million acres of land in the form of a circle 80 miles in diam have been bought by the Liberia Mining Co., Ltd. These rights run for 80 years. Since the deposit is right in the center of this area, the company appears on stable footing.

Currently, a 40 mile railroad is under construction from the mine to the port. It will cost about \$2 million. And, since the ore can be mined by open pit methods, cost of getting it to the port will be low in comparison with mining and transportation costs in Brazil and Venezuela.

The Port of Monrovia is one of

the most modern. It was completely rebuilt several years ago to a 1000 ft frontage capable of docking vessels with 30 ft displacement. The facilities are operated by a Port Authority composed of seven American companies with different and varied interests in Liberia.

Although it is not generally realized, the shipping distance from Liberia to our Eastern ports is several hundred miles shorter than from Brazilian ore shipping ports to the United States. In addition, transshipments are at a minimum.

Several American steel companies have already shown an interest in this reserve. One has sent a representative to study its possibilities. However, although dickering continues, no contracts have as yet been signed for ore purchases.

No Congressional Hurry On "Economic Stability"

Washington

• • • Congressional leaders decided last week that they are in no great hurry to take up the Administration's so-called "economic stability" program.

The White House recommendations for government-built productive capacity, mandatory allocations, and other controls over business were formally unwrapped on Feb. 15 by Representative Spence, D., Ky., chairman of the House Banking Committee.

Congressional strategy so far indicates that: (1) Senate and House leaders want to sound out members of Congress on the far-reaching proposals, (2) A period of several weeks between introduction of the bill and the opening of hearings will provide an opportunity for sampling public reaction, (3) Any further signs of a drop in demand for scarce commodities—particularly steel—or of continued price declines might well reduce the whole controversy to an academic question.

The 42-page Administration bill as introduced by Mr. Spence provides, among other things, for government studies of shortages, loans for capacity expansion, construction of new capacity, voluntary priority and allocation powers,

mandatory priority and allocation powers, extension of import controls, 60-day notice of intended price increases, conditions for establishing maximum prices, decontrol, limitation—under certain conditions—of wages. The program would remain in effect until June 30, 1951, under provisions of the bill.

The proposed program also would empower the President to buy "essential metals, minerals, and other raw materials, including liquid fuels." This recommendation is a marked departure from earlier

peacetime economic proposals, and would, in effect, give to the President power usually considered essential only in time of war or national emergency.

Dr. Edwin G. Nourse, chairman of the President's Council of Economic Advisers, has thus far remained silent on the White House proposal to build and operate plants in basic industries. But the other two members of the council—Leon H. Keyserling and John D. Clark—gave warm support to the proposition in hearings before the Joint Economic Committee.

Lebanon Completes Alloy Casting Expansion Plans

Lebanon, Pa.

• • • Lebanon Steel Foundry has completed a \$500,000 plant expansion program that doubles the company's high alloy steel casting facilities, according to William H. WorriLOW, president.

The new plant addition and equipment installations are specially designed for the production of superalloy castings under a process developed by Firth-Vickers Stainless Steels, Ltd., of Sheffield, England.

As exclusive American licensee of Firth-Vickers, Ltd., Mr. WorriLOW said, Lebanon Steel Foundry is using the process to make superalloy castings for warplane jet

engines. Adaptations for other military and industrial requirements are also being studied.

Opening the door to new metallurgical, engineering and design applications, the British-developed process of centrifugal casting in permanent molds, known as Centri-Die casting, was described by Mr. WorriLOW as one of the important improvements in alloy steel foundry progress.

Ford Joins Ford Motor Co.

Detroit

• • • William Clay Ford, youngest of three grandsons of the late Henry Ford, will join the Ford Motor Co. in March. The younger Ford, 24, recently graduated from Yale University with an A.B. degree.

Warns of Approaching Mineral Supply Crisis In the United States

San Francisco

• • • A warning of an approaching crisis in U. S. mineral supplies which may require that international affairs in the future be studied from the viewpoint of their possible influence on U. S. mineral sources, was voiced by Alan M. Bateman, Yale University, in a symposium on national mineral policy held here this week in conjunction with the annual meeting of the American Institute of Mining and Metallurgical Engineers.

Dr. Bateman pointed out that on the basis of the period of 1935-1944 a study of the life of the reserves of 41 principal metals and minerals shows 15 of these 41 would last a half century or more; three would last from 33 to 39 years while the remaining 23 have an indicated life of less than 25 years. Of these last 23, 9 have a life of less than 10 years, while for 8 there are no present reserves.

The annual banquet of the association, held Wednesday at the Palace Hotel, saw Lewis E. Young, Pittsburgh consulting engineer, inducted as president for 1949. Mr. Young succeeds W. E. Wrather.

In addition to exploring the mineral problems of the U. S., the technical sections placed much emphasis on powder metallurgy and titanium. A series of four papers by engineers of the Bureau of Mines and the Titanium Div. of National Lead Co. told in detail the development of an electric smelting procedure for smelting ilmenite in an electric furnace. One of the papers described the operation of a pilot plant which produced 36,190 lb of titanium rich slag and 19,057 lb of pig iron. The pig iron, however, was rather high in sulfur and not economically suited to steel making or foundry use without extensive additional processing.



Alan M. Bateman

Motch & Merryweather Opens New Tool Plant

Cleveland

• • • Motch & Merryweather Machinery Co., one of the oldest and biggest machine tool dealers in the country, recently opened a new plant for the rebuilding of machine tools for resale at 1350 East 222nd Street, Euclid, Ohio.

The new plant contains 30,000 sq ft of floor space, including office area, and has facilities for rebuilding all types of machine tools. The company has been rebuilding machine tools for resale since 1904, in addition to its sales activities in the new machine field. Construction of the new plant was started about one year ago.

George Merryweather is in charge of the new plant. Frank Holberger is plant superintendent and E. J. Kossuth, sales manager.

Motch & Merryweather manufactures cold circular sawing machines, transfer machines and special sawing equipment in addition to its saw blades, at its factory at 888 East 70th Street, Cleveland.

Steel Distribution by Consuming Industries (1939-48)

(In Thousands of Net Tons)

	1939		Yearly Average 1941-44 Inc.		1945		1946		18947*		1948**	
	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct
Agriculture	1,421	3.6	1,565	2.4	2,426	4.3	2,100	4.3	2,422	3.81	2,700	4.11
Aircraft							32	.06	44	.16	39	.06
Automotive	5,906	15.1	5,557	8.8	5,521	9.7	7,379	15.1	10,292	16.30	11,044	16.81
Construction and Maintenance	6,100	15.6	8,379	13.3	8,353	14.7	8,130	16.7	10,039	15.90	10,866†	16.54†
Containers	2,978	7.6	4,216	6.7	4,333	7.6	4,749	9.7	5,596	8.87	5,788	8.81
Machinery, Tools	1,460	3.7	3,191	5.1	4,739	8.3	4,438	9.1	5,648	8.96	5,565	8.47
Oil, Gas, Water, Mining	1,842	4.7	2,221	3.5	2,670	4.7	2,480	5.1	3,833	6.08	4,800†	7.31†
Pressing, Forming												
Stamping	1,842	4.7	2,809	4.5	3,800	6.7	3,127	6.4	3,770	5.98	4,244	6.46
Railroads	3,250	8.3	5,422	8.6	5,268	9.3	4,764	9.8	5,999	9.50	6,283	9.56
Shipbuilding	518	1.3	9,657	15.3	3,374	5.9	320	.64	373	.59	640	.97
Exports	2,817	7.2	7,701	12.2	3,793	6.7	3,378	6.9	4,639	7.36	3,607	5.49
All Others	10,933	28.2	12,212	19.4	12,669	22.2	7,879	16.2	10,402	16.49	10,124	15.41
Total	39,067	100.0	63,490	99.8	56,946	100.0	48,776	100.0	63,057	100.00	65,700	100.00

* Revised.

** Preliminary.

† Corrected

STEEL DISTRIBUTION CORRECTION: Preliminary figures for Steel Distribution by Consuming Industries which appeared in THE IRON AGE, Jan. 6, 1949, p. 182, have been corrected. Some oil and gas tubing was recorded under "Construction and Maintenance." It should have been allotted to "Oil, Gas, Water and Mining." Revised figures are shown below. See page 132 for details.

5-Year Pact by K-F, Republic Is Declared Satisfactory to Both

Cleveland

••• Republic Steel Corp. has worked out a 5-year arrangement with Kaiser-Frazer Corp. satisfactory to both Republic and Kaiser-Frazer for the continued operation of the government-owned blast furnace here as a result of which Republic will continue in the merchant pig iron business in the north. This agreement was anticipated by THE IRON AGE, Feb. 10, p. 125.

Kaiser-Frazer will receive approximately 12,000 tons of pig iron per month from this furnace at regular market prices.

Republic is installing a new 200-ton openhearth furnace in its Cleveland plant, the entire cost of which will be paid for by Kaiser-Frazer and the output of which will be purchased from Republic by Kaiser-Frazer in the form of sheets, approximately 7000 tons per month, at regular market prices. Trade sources estimate the cost of the new openhearth at \$2,500,000.

According to K-F representatives, the furnace will produce 150,000 tons a year, which will raise Republic's annual output here to 1,650,000 tons. Present plans call for the furnace to be in operation Aug. 1.

Under the new agreement K-F will buy 12,000 tons of pig iron at the market price from Republic, more than double the 5000 tons monthly requirement of the old agreement, which expires May 1. The new agreement is effective the same day.

The government-owned blast furnace which Republic operates under the agreement is rated at 38,000 tons a month. Thus K-F with shipments of 12,000 tons of pig iron and 7,000 tons of sheets a month will receive about half the output of this furnace.

By and large, the new agreement was hailed as shrewd horse-trading by Charley White, Republic president. In effect, Republic gains the following: (1) A new 150,000 ton openhearth furnace costing probably \$2,500,000, free of charge, (2) continued operation and half the output of the government-owned blast furnace here at rental substantially less than K-F is paying WAA, (3) a long range, 5-year

market for pig iron and sheets, at going market prices.

On the other hand, K-F has now a legitimate mill source of sheets at going market prices and will be relieved immediately of the need for part of its conversion tonnage.

FBI Arrests Four In Highway Steel Theft

Pittsburgh

••• The largest of seven steel thefts in this area during the past year was believed solved last week with the arrest of four men by the FBI. Six other steel thefts, several within the last few months, are still under investigation.

The FBI last week announced the arrest of two officials of a nearby McKees Rocks scrap company and of two Steubenville, Ohio, men. J. E. Thornton, agent in charge of the FBI office here,

Officials of the Institute of Scrap Iron & Steel report that Roman Bros. Scrap Co. is not an institute member.—Ed.

said that steel stolen Jan. 23 from two truck trailers in Ohio had been found in the Roman Bros. Scrap Co. warehouse, McKees Rocks.

The steel, 30 tons of cold-rolled sheets, was enroute to Briggs Mfg. Co., Detroit. Briggs had sent it in the form of slabs to the Steubenville Works of Wheeling Steel Corp., where it was cold reduced. The tractor pulling the two trailers broke down near Rowsburg, Ohio. While the Aetna Freight Lines' driver left to get a mechanic, the trailers were stolen.

They were later recovered empty near Unity, Ohio.

The FBI said that the men arrested were Charles Roman and Joseph Cozzo, of the McKees Rocks company; William H. Zeder, a salesman, and Hubert Terry, a truck driver, both of Steubenville.

According to the FBI, a Wheeling Steel official identified the steel. How he did so will not be disclosed until the case is tried.

Murray Demands More Steel

Pittsburgh

••• Philip Murray last week outlined his USWA union stand on steel capacity from the hospital bed here where he is recovering from an appendectomy. The Steelworkers' president wired it to Rep. Brent Spence (Dem.), Chairman of the House Banking and Currency Committee, in connection with a bill to provide for steel expansion with public funds.

He said the Steelworkers were prepared to show that: (1) Industry capacity and expansion figures are "greatly inflated"; (2) there is still a shortage of steel holding back production in other industries; (3) industry spokesmen have been poor prophets of the length of the shortage; (4) several companies would gladly take government expansion loans; (5) sufficient materials can be made available for expanding; (6) expansion will not be as expensive as estimated, and (7) national defense potential needs make further delay "a dangerous gamble."

Coming Events

- Feb. 28 to Mar. 4 American Society for Testing Materials, spring meeting, Chicago.
- Mar. 8-10 Society of Automotive Engineers, passenger car, body and production meeting, Detroit.
- Apr. 4-6 American Gas Assn., distribution, motor vehicle and corrosion conference, Cincinnati.
- Apr. 5-6 Metal Powder Assn., annual meeting, Chicago.
- Apr. 8-9 Lead Industries Assn., annual meeting, Chicago.
- Apr. 11-12 American Machine Tool Distributors' Assn., spring meeting, Savannah, Ga.
- Apr. 11-12 American Zinc Institute, annual meeting, St. Louis.
- Apr. 11-14 National Assn. of Corrosion Engineers, annual conference and exhibition, Cincinnati.
- Apr. 11-15 Western Metal Congress and Exposition, Los Angeles.
- Apr. 18-20 Midwest Power Conference, Chicago.
- Apr. 18-20 American Institute of Mining & Metallurgical Engineers, annual conference of Openhearth Steel Committee, Chicago.
- Apr. 19-20 Magnesium Assn., annual meeting, Chicago.

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

- 725 Tons, Evansville, Ind., warehouse for the Seeger Refrigerator Co., Evansville, to International Steel Co., Evansville, Ind.
- 550 Tons, Don, Idaho, furnace building, through United Engineers & Constructors, Inc., Philadelphia, to Herrick Iron Works, San Francisco.
- 400 Tons, Denver, State highway bridge UG-1-90-4 to E. Burkhardt & Son Iron & Steel Co., Denver.
- 350 Tons, Cheektowaga, N. Y., new school, District 3, to Ernst Iron Works, Buffalo, through John W. Cowper Co., General contractors.
- 315 Tons, Perley, Minn., Red River State highway bridge section 6332, to American Bridge Co., Pittsburgh.
- 195 Tons, East Peoria, Ill., Bridge for Toledo, Peoria & Western R.R. through U. S. Engineers Office, Chicago, to Bethlehem Steel Co., Inc.
- 130 Tons, Sauk Co., Wis., State Highway Bridge Section S-0216-4 to Worden-Allen Co., Milwaukee.

110 Tons, East Rutherford, N. J., 1-story shipping building to Grand Iron Works, New York.

100 Tons, Cavendish, Vt., bridge through Miller Construction Co., Windsor, Vt., to Vermont Structural Steel Co., Burlington, Vt.

• • • Fabricated steel inquiries this week included the following:

675 Tons, Chicago, Double Deck Highway from Lake to Randolph St. Bids close Feb. 24.

250 Tons, Valley Forge, Pa., precision casting plant for Ehret Magnesia Mfg. Co., through Kuljian Corp., due Mar. 1.

175 Tons, Chicago, Eden Parkway.

155 Tons, Ayer, Mass., steel pony truss bridge.

150 Tons, Worcester, Mass., bituminous concrete road.

135 Tons, Camden, N. J., three foremasts and three mainmasts for New York Shipbuilding Corp., due Feb. 25.

• • • Reinforcing bar awards this week included the following:

590 Tons, Cook Co., Ill., State Highway Bridge 263-0202-12 previously reported awarded to Thomas McQueen Construction Co., U. S. Steel Supply Co., Chicago, will fabricate.

535 Tons, Beloit, Wis., high school building through Sherry Richards Co., Chicago, to Truscon Steel Co., Youngstown, O.

175 Tons, Cheektowaga, N. Y., new school, District 3, to Truscon Steel Co., Buffalo, through John W. Cowper Co., general contractors.

• • • Reinforcing bar inquiries this week included the following:

300 Tons, Hinsdale, Ill., high school building.

185 Tons, Olympia, Wash., Marshall overhead bridge, Spokane Co. Road, Director of Highways, Olympia, bids to Mar. 4.

170 Tons, Lincoln and Stevens Cos., Wash., bridge on SSH No. 3-J., Spokane River bridge at Long Lake, Director of Highways, Olympia, bids to Mar. 4.

125 Tons, Douglas Co., Ore., bridges on Coos Bay-Roseburg highway, Oregon State Highway Commission, bids to Feb. 28.

115 Tons Davis, Calif., bridge across Putah Creek, California Div. of Highways, Sacramento, bids to Mar. 16.

50 YEARS AGO

THE IRON AGE, February 23, 1899

• The eight-hour day was still a long way off as, "the Senate Committee on Education and Labor once again reported the so called Eight-Hour Labor Bill to the Senate with certain amendments but without recommendation. A strong effort will be made to get the bill through this session of Congress, but prospects of getting it passed are not encouraging."

• "A bill just passed by Congress authorizes the Muscle Shoals Power Co. to build and operate a canal at Sheffield, Ala., at a cost of \$1 million." Promoters of the project intend to generate power for electric lights for Sheffield and other nearby Alabama towns and also power for manufacturers. "The power canal will be constructed on the site of the Tennessee River, opposite the Government canal."

• Here's one—an investor's dream. "The Lackawanna Iron and Steel Co. has declared a dividend of \$50 per share on their stock and are calling for bids on

the \$1.2 million of 5 and 6 pct bonds outstanding on their Scranton plants. The balance of the proceeds of the sale of their Scranton coal lands is retained in the treasury."

• "The worm has turned, and the scrap iron dealer, oppressed on one side by the railroad purchasing agent who insists on selling to the highest bidder, and on the other side by the consumer who insists on buying on certain arbitrary terms, is rising to be a great power in the land and to join the recent army of trusts. Before long representatives will be sent to New Jersey to incorporate, possibly under the name of the American Junk Co."

• Today General Motors has its Hyatt Roller Bearing Div. This issue of THE IRON AGE carried news of an historical event. "The Franklin Institute of Pennsylvania has awarded the John Scott legacy premium and medal to John W. Hyatt for his invention of the elastic spiral antifriction roller."

Southwest Construction Up

Houston

• • • Industrial construction in the Southwest during 1949 will at least equal the high level reached in 1948, according to C. W. Roberts, Southern District Manager of the H. K. Ferguson Co., industrial engineers and builders.

A recent survey made by the company revealed that there were seven factors indicating a large volume of industrial building in the Southwest during the next year.

"Wage increases already granted or in the making will increase construction costs in this area," Mr. Roberts said, "but the increase will be offset somewhat by better labor productivity and improved materials."

Makes Gas-Filled Cable

Schenectady

• • • A large medium-pressure gas-filled 69 kv cable is now being manufactured here by the General Electric Wire & Cable Div.

Company officials say that the installation, of which half will be buried directly in the ground rather than run through ducts, is the first of this rating ever ordered.

The circuit will run between the Braddock Light and Power Co. station on the bank of the Potomac River into a substation at the Pentagon Building, Alexandria, Va. Braddock Light and Power is an affiliate of the Potomac Electric Power Co. system.

Only **GOULD** Has It!



Gould uses the Metalloscope to photograph high magnifications of the structure of cast lead connectors, parts and grid frames.

A modern research
laboratory with
pilot manufacturing plant
where advance-design batteries
are constantly created—
and proved before production.

The Metalloscope, a combination high-powered microscope and camera, is helping Gould scientists find the answers to age-old lead casting problems. With it, the complex crystalline structure of lead castings has become an open book. As a result, information rapidly becoming available points the way to even stronger, electrically more efficient grid frames, posts, straps and connectors. For better batteries always, choose **GOULD—FOR FIFTY YEARS THE CHOICE OF ENGINEERS.**



The Gould "Thirty"—America's
Finest Industrial Truck Battery!

GOULD

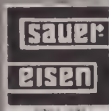
**STORAGE BATTERY
CORPORATION**

Including the Storage Battery Division
of Philco Corporation

1000 TONNETT, NEW JERSEY

Always Use Gould Automobile and Truck Batteries

SAUEREISEN Steel Mill ACID-PROOF CEMENTS for ACID-PROOF FLOORS



and
ACID PICKLING TANKS

ACID PROOF STACKS

In leading steel mills as well as chemical and processing plants, tanneries, dairies and oil refineries, acidproof floors like this are constructed with Sauereisen Acid Proof Cements. Many firms also use these Steel Mill Cements for acid pickling tanks and acid proof stack construction.

SAUEREISEN ACID PROOF CEMENT NO. 31—A quick-setting, self-hardening cement which resists water, oil, electricity, most solvents, all acids (except hydrofluoric) and temperatures to 2000 deg. F.

SAUEREISEN ACID TANK SEALER NO. 44—A black plastic resistant to acids and water. Applied cold by troweling, becomes firm but remains pliable indefinitely. Used as an impervious coating over concrete, brick, steel and wood.

Investigate—compare—Mail the coupon below

SAUEREISEN CEMENTS COMPANY
406 Sharpsburg St., Pittsburgh 15, Penna.

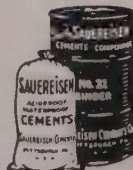
TRY THESE MODERN STEEL MILL CEMENTS—AND COMPARE!

SAUEREISEN CEMENTS COMPANY
Pittsburgh 15, Pa.

☐ Please send me your Steel Mill Cement Trial Order of:

50 lb. lot of Sauereisen Cement No. 31 } **\$14⁹⁵**
1 gal. can Sauereisen Sealer No. 44 }

☐ Send me your latest Acid Proof Cement Folder



Name..... Company.....
Address.....

UN Signs \$23 Million Contract With Joint Firm of Contractors

New York

•••The contract between the United Nations and Fuller-Turner-Walsh-Slattery, Inc., for the construction of the Secretariat building at the permanent headquarters in Manhattan was signed at the present headquarters in Lake Success recently. This will be the first unit of the permanent headquarters. The contract for \$23,809,573 includes also the foundations for the General Assembly and the meeting hall area containing the Council chambers and conference rooms. Excavation work on the site has been nearly completed.

The contract was signed by Secretary-General Trygve Lie on behalf of the United Nations and Lou R. Crandall, president of the corporation, and James Slattery, its secretary.

The corporation comprises four leading construction companies: the George A. Fuller Co., of which Mr. Crandall is president; Turner Construction Co., H. C. Turner, Jr., president; Walsh Construction Co., William Durkin, president, and Slattery Contracting Co., James Slattery, president.

Site of the permanent headquarters is a 17-acre tract of land bordering on the East River between Forty-second and Forty-eighth streets. Most of the six-block site was donated by John D. Rockefeller, Jr.

Occupancy of the Secretariat building is scheduled for the fall of 1950. Delivery of the 13,000 tons of steel for the building will begin March 15. It is estimated that steel erection will be completed by Oct. 1. Sinking of piers for the columns of the building has already begun.

Reports Net Income

Hubbard, Ohio

•••Valley Mould & Iron Corp. reported net income for 1948 of \$1,952,273, equal to \$18.80 a common share, compared with 1947 net of \$1,630,091, or \$15.47 a share.

You get better service
wherever you see this sign



There's a *Macwhyte* Rope that's the *right* rope for your equipment. All job-proved—a thousand and one wire ropes to choose from.

Our distributors and mill depots—located at convenient points all over the country—carry stocks for immediate delivery. Ask a Macwhyte representative to recommend the rope best suited for your equipment.

MACWHYTE COMPANY

2911 Fourteenth Avenue • Kenosha, Wisconsin

Manufacturers of Internally Lubricated Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope.

Catalog on request

For easy handling and longer service

Use PREformed Whyte Strand Wire Rope—it's

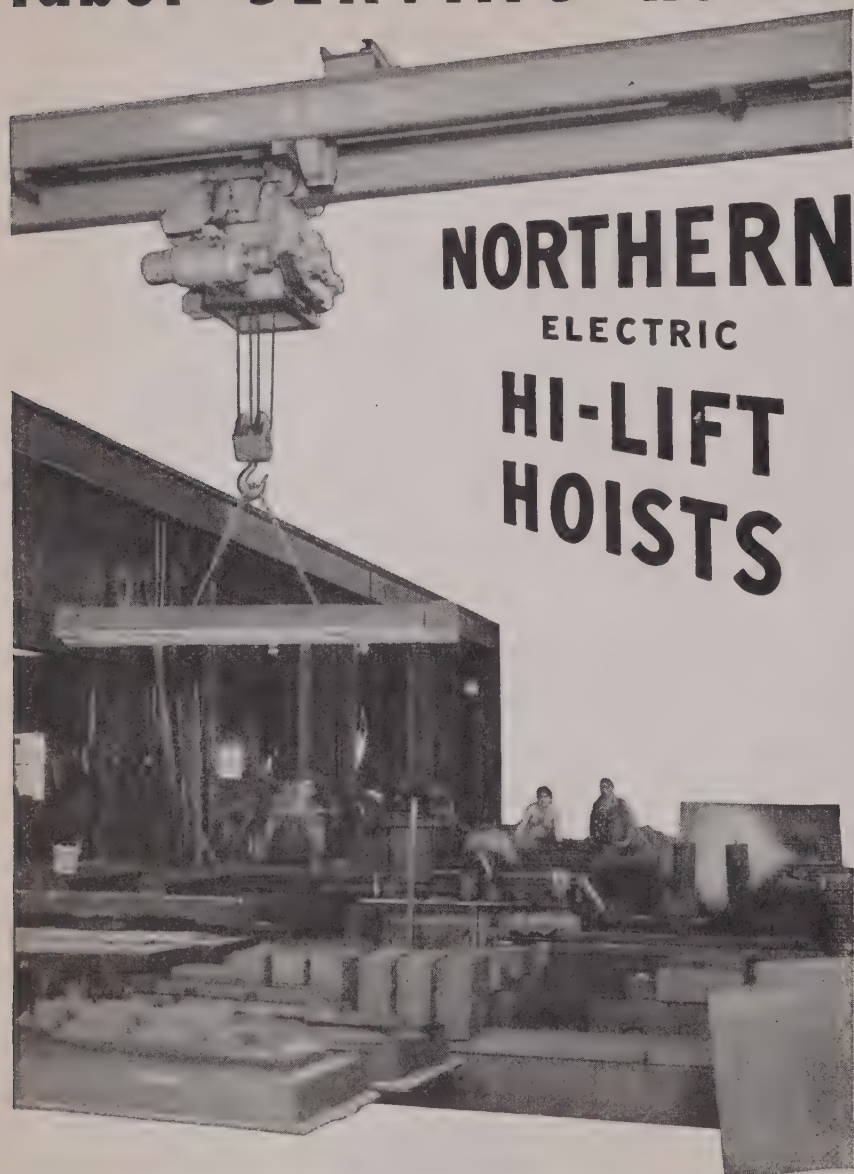
internally lubricated



Mill Depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles

labor SERVING hoists

NEWS OF INDUSTRY



NORTHERN ELECTRIC HI-LIFT HOISTS

MEAN BETTER HOUSEKEEPING

Neat stacking of work, free straight aisles, cleaner floors, orderly arrangement of work for better visibility and supervision, means better foundry or shop efficiency. MECHANIZE with LABOR SERVING NORTHERN ELECTRIC HI-LIFT HOISTS to make good housekeeping easier.

★ Let us send Bulletin No. 135-H ★

OVERHEAD ★ NORTHERN
ELECTRIC CRANES ★ ENGINEERING WORKS
AND HOISTS ★ 2615 Atwater St., Detroit 7, Mich.

January Steel Output Reached an All Time High—8 Million Tons

New York

• • • Production of steel exceeded 8 million tons a month for the first time in January, according to the American Iron and Steel Institute. The total of ingots and steel for castings was 8,172,236 net tons, which exceeded the entire 1948 output in any other country except Great Britain and Russia.

This new high level was an increase of 401,000 tons over December 1948, and nearly 700,000 tons over January 1948. The latter is an unusually large gain compared with previous year-to-year comparisons.

Steelmaking furnaces of the industry were operated at an average of 100.1 pct of the new record high capacity. It was the third recent month in which operations were at or above 100 pct, the other two being October and November, 1948.

The January output indicates the ability of the industry to make a lot more steel in 1949 than the total of 88,533,000 tons reported for last year, the Institute said.

Curbs Air Pollution

Detroit

• • • General Motors has declared war on airborne chemicals which cause damage to homes, steel and iron work, and concrete and vegetation.

GM's nationwide campaign to curb air pollution will be under the direction of L. A. Danse of GM's Products Engineering Section.

One of the initial steps in the GM program, according to Danse, will be to conduct tests using a new condenser being designed for the Navy. The condenser is reported to make it impossible to detect ships by their smoke.

Coal dust, sulfur, cyanide and muriatic wastes, alkalies, oil and chromic acid mists were included among the pressing problems. Air in the vicinity of grinding and buffing operations often contains particles of iron or steel, Danse said.

For heavy-tension cold-rolling,

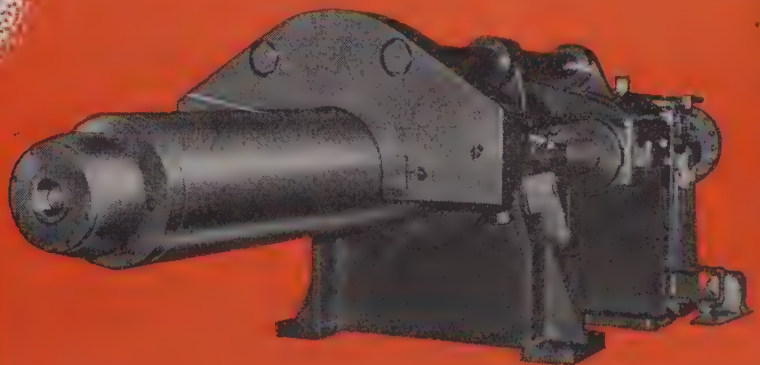
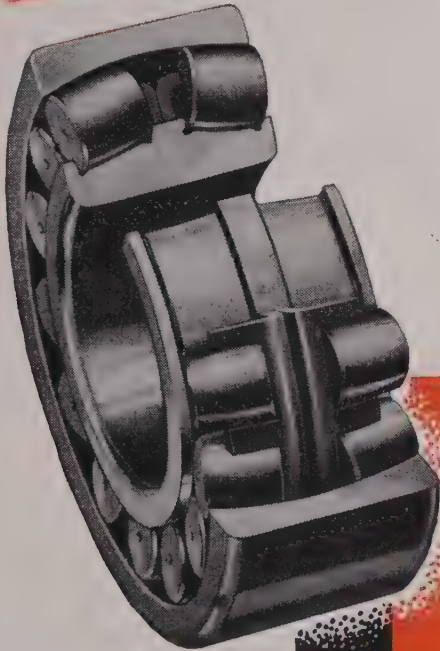
Bliss specifies SKF Bearings on Reels

The New Bliss 24" x 84" Tension Reel . . . 800 HP at 200 to 400 RPM . . . rolls smoothly and accurately on 4 SKF Self-Aligning Spherical Roller Bearings. Coiling strip steel under heavy tension, for the cold-rolling operation, is an important step in steel processing. The reel must stand up under almost continuous duty . . . and to assure bearing efficiency Bliss looked to SKF.

Heavy tension deflects the drum shaft, but the SKF bearings have undiminished capacity to absorb the working load. The deflection is always greatest at the heaviest loads . . . thus, inherent rolling alignment is of primary importance.

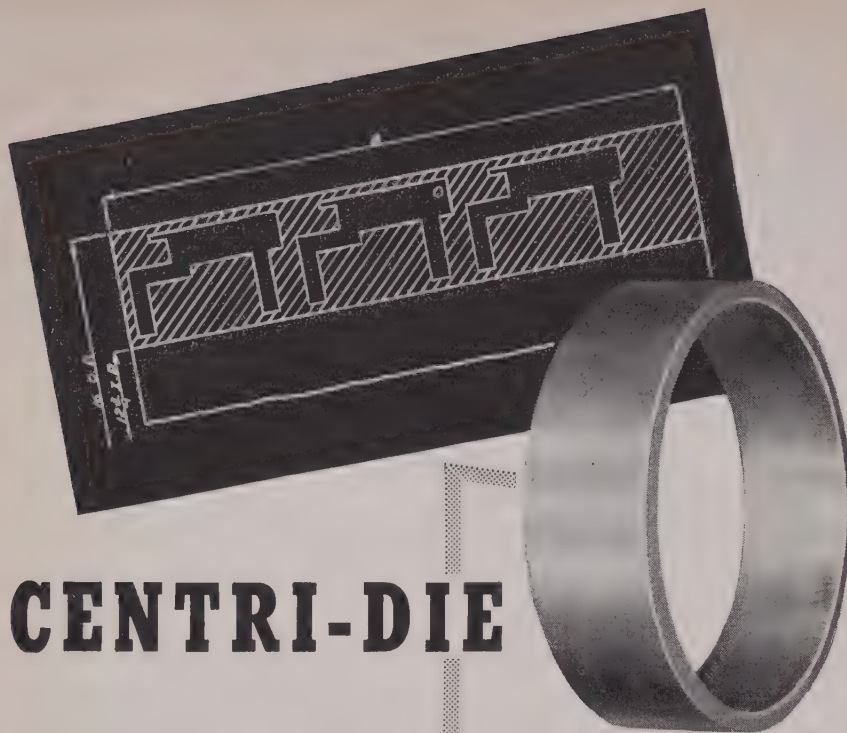
This is but one application of SKF bearings, our engineering staff can help you with your bearing problems. Write: SKF Industries, Inc., Philadelphia 32, Pa.

6663



Industrial bearings engineered by

SKF



CENTRI-DIE

Illustrated above is a cross section of the metal ring shown in the photograph. Notice how three rings of intricate cross section have been grouped in this one cylinder to conserve metal. By Lebanon's CENTRI-DIE process of centrifugal casting a uniform metal structure is assured throughout each ring as finally machined.

A booklet describing this new casting process and the alloys adaptable to CENTRI-DIE production is yours for the asking.

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In the Lebanon Valley"

a **NEW**
casting process
which assures
greater
uniformity
of metal
structure

Some Advantages of the CENTRI-DIE Process of making centrifugal castings

1. Higher quality castings of greater density, resulting in decidedly enhanced physical properties.
2. Readily achieved production of assorted parts and complex structural shapes which cannot be cast satisfactorily by static methods.
3. Uniform strength throughout—a characteristic which does not apply to forgings, as no flow lines exist in castings.
4. The use of alloys which are difficult or impossible to forge, opening the door to applications hitherto considered impractical or too costly.

LEBANON
ALLOY AND STEEL

Castings
L

Walter D. Appel to Join Ford Staff at Dearborn

Dearborn, Mich.

• • • One of the auto industry's best known authorities on light cars has been named vice-president—engineering for the newly formed Ford International Co. Walter D. Appel will join Ford at its Dearborn headquarters March 7. Appel recently resigned from Willys-Overland to accept the Ford appointment.

Mr. Appel is a graduate of Case Institute of Technology. He has been associated with the automobile industry since 1918, serving, at various times, the Cleveland Automobile Co., Oakland Motor Car Co., Export Div. of General Motors, including Vauxhall Motors Ltd., England and Adam Opel A. G. He was later appointed chief engineer of Overseas Operations Div. of General Motors.

Appel joined Willys-Overland in May 1946 as assistant to the vice-president of engineering and in January 1947 was appointed chief engineer.

Makes Merchant Pig Iron

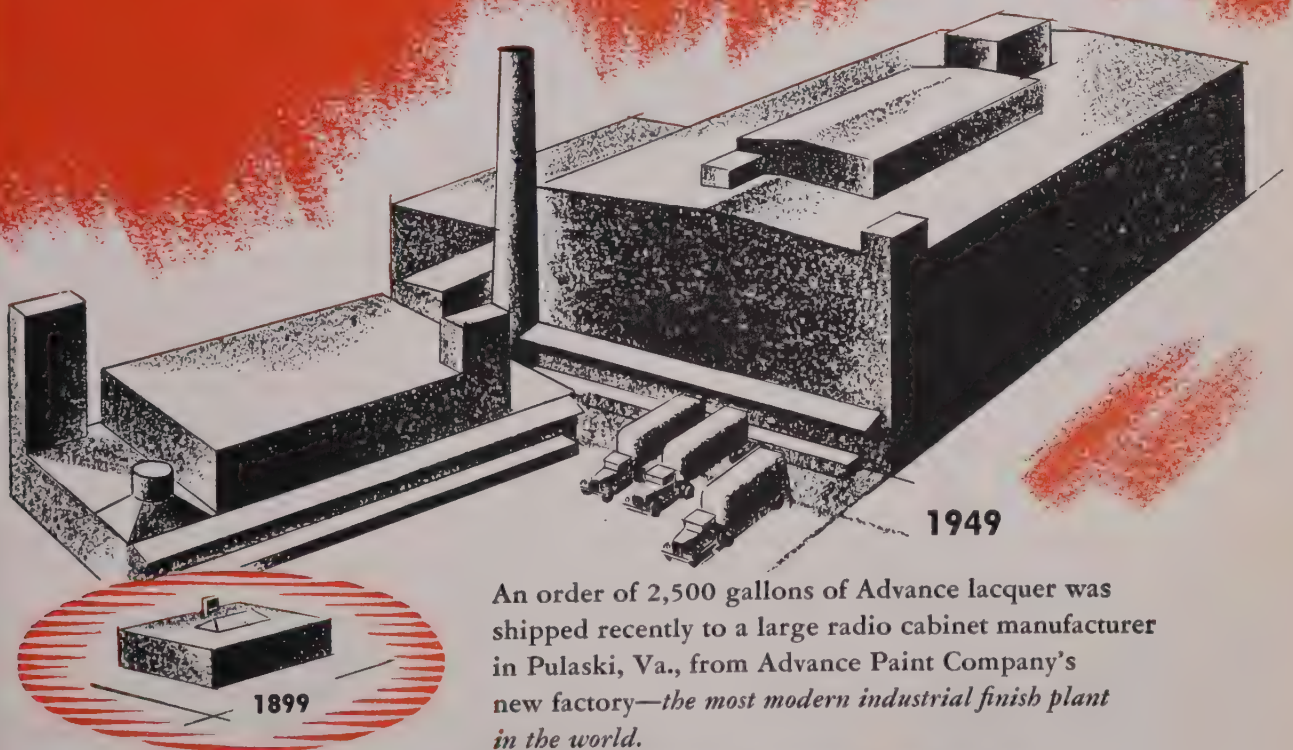
Nashville, Tenn.

• • • Tennessee Products & Chemical Corp. announced last week that it had begun to manufacture merchant pig iron at its Rockwood, Tenn., furnace. It confirmed trade reports that that furnace was to be taken off ferromanganese.

The company did not announce any spot prices, though it is understood some price contracts have been signed. It is believed that current market conditions make establishment of a price difficult at the moment. It was said that pressure for pig iron from southern foundries was one factor in the decision to abandon ferromanganese production.

Last year the Rockwood furnace produced about 25,000 tons of ferromanganese. Power cuts at Niagara Falls have hurt ferromanganese production there and an E. J. Lavino & Co. furnace has been off for relining. This unit at Lynchburg, Va., was brought in again on Feb. 5, but the company's Sheridan, Pa., furnace is due to be taken off for relining within a month or two.

FIRST SHIPMENTS MADE FROM WORLD'S MOST MODERN INDUSTRIAL FINISH FACTORY



An order of 2,500 gallons of Advance lacquer was shipped recently to a large radio cabinet manufacturer in Pulaski, Va., from Advance Paint Company's new factory—the most modern industrial finish plant in the world.

This shipment marked the beginning of better finishes and better service for Advance customers. The new factory utilizes the latest methods of product control, complete gravity-flow processes and equipment designed especially for this plant . . . increases manufacturing facilities six times.

Advance designed its new factory on the basis of 50 years experience in formulating finishes to the requirements of specific jobs. Plan your production schedules around Advance's ability to meet your finish requirements faster.

Manufacturers of Industrial Finishes



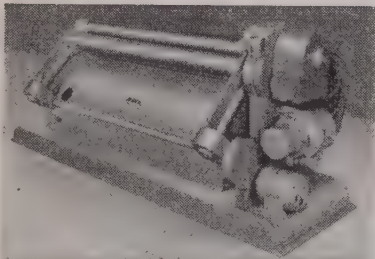
Advance

PAINT COMPANY
INDIANAPOLIS, INDIANA

HERE THEY ARE! THE NEW ALL-STEEL REED PINCH TYPE BENDING ROLLS

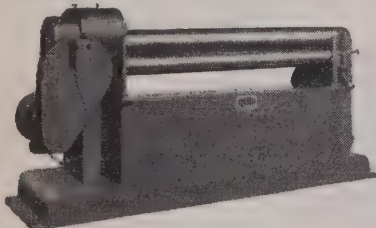
FEATURING:

- WELDED STEEL CONSTRUCTION
- BRONZE BEARINGS THROUGHOUT
- SILENT WORM GEAR DRIVE
- AUTOMATIC DROP END (RAISES TOP ROLL WHEN DROP END IS LOWERED)



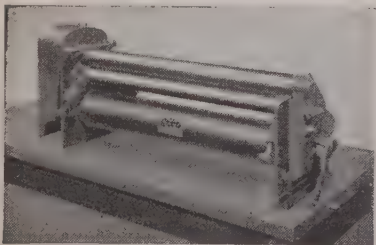
MODEL	DIA. ROLLS	CAPACITY
604	6"	48" x 5/16"
605	6"	60" x 1/4"
606	6"	72" x 3/16"
608	6"	96" x 10 GA.

5 H.P. MAIN MOTOR DRIVE—POWER ADJUSTMENT ON REAR ROLL OPTIONAL.



MODEL	DIA. ROLLS	CAPACITY
438	4 1/4"	36" x 10 GA.
444	4 1/4"	42" x 11 GA.
450	4 1/4"	48" x 12 GA.
462	4 1/4"	60" x 14 GA.
474	4 1/4"	72" x 16 GA.

1 H.P. OR 1 1/2 H.P. MAIN MOTOR DRIVE



MODEL	HAND POWER	DIA. ROLLS	CAPACITY
H 338	P 338	3"	36" x 14 GA.
H 344	P 344	3"	42" x 15 GA.
H 350	P 350	3"	48" x 16 GA.

3/4 H.P. DRIVE ON POWER DRIVEN MODELS

Truly modern machines for both job and production work—Time Tested—Shop Proven.

All sizes available NOW for Prompt Delivery—some sizes from stock.

MANUFACTURED BY

REED ENGINEERING CO.
CARTHAGE, MISSOURI, U. S. A.

NEWS OF INDUSTRY

Washington Approves Revised Cut Tack, Nail Standards

Birmingham

• • • The National Bureau of Standards has announced that the revision of the Simplified Practice Recommendation for cut tacks and small cut nails, recently submitted for the consideration of all segments of the industry, has been accorded sufficient support and the Standing Committee in charge of the recommendation has approved it for promulgation. It will be designated R47-49.

The revised recommendation establishes lists of types, sizes, finishes and package sizes of cut tacks and small cut nails as a standard of practice for the industry. The items are covered under two general headings: a hardware list and a shoe finders list.

Kennecott Strike Ends

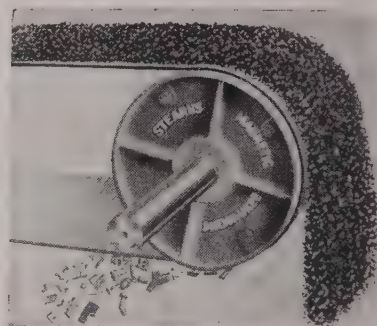
Salt Lake City

• • • The 103-day strike at Kennecott Copper Corp.'s Utah properties, which ended early this month, caused an estimated loss of some \$40 million worth of recoverable metals. The big loss was in copper, one of the metals in short supply, but gold, silver and molybdenum accounted for several million dollars of the amount.

The truce was finally reached on a basis that was proffered 2 weeks after the strike started—appointment of a fact finding board by the U. S. mediation and conciliation service. The union proposed the fact-finding board procedure whereas the company held out for a job evaluation procedure.

This strike provided an impressive example of what a labor dispute involving a small segment of an industrial operation can do to the whole enterprise. On strike were 311 employees of the open pit mine railroad system. In terms of market value of metals lost it cost in the neighborhood of \$130,000 per employee to carry the fight on to this point. And the issues are not yet resolved because the fact-finding board report will not be binding on either side. The state's loss in tax revenues will amount to almost \$4000 per man.

We Make Both Electro and Permanent Magnetic Pulleys



If you want the most powerful, highly efficient, Magnetic Pulley for tramp iron removal, install the Stearns Electro-Magnetic Pulley. Especially designed for heavy duty jobs, the Stearns Electro-Magnetic Pulley alone offers the ultimate for separation or concentration problems.

However, for certain light duty applications, Stearns Permanent Magnetic Pulleys (shown above) may be used. The best permanent magnetic pulleys money can buy, they require no wiring, are easily installed and eliminate operating expense.

Consult Stearns Magnetic for recommendations on your particular problem. Write for Bulletin 303 on Electro-Magnetic Pulleys or Bulletin 350 on Permanent Magnetic Pulleys.

IF IT'S MAGNETIC WE MAKE IT

PULLEYS • BRAKES
DRUMS • CLUTCHES
SEPARATORS • FILTERS
ORE CONCENTRATORS
SEPARATION
OR LIFTING MAGNETS

Stearns
MAGNETIC
MANUFACTURING CO.

635 So. 28 St.

Milwaukee 4, Wis.

PATENTED
STRONGBARN
ROOFING



Patented Strongbarn is the superior, *and exclusive*, product of the Granite City Steel Company.

Hundreds of farmers and others who have used Granite City Strongbarn in the construction of buildings, demand Strongbarn because of its superiority over conventional types of corrugated steel roofing.

**STRONGBARN GALVANIZED STEEL
ROOFING AND SIDING
IS STRONGER, BETTER, CHEAPER**

STRONGBARN means tighter roofs and siding. It stays flat and even, with tight joints. That's why it resists winds that tear and buckle conventional roofing.

STRONGBARN is easy to apply. Because it is stronger and tougher, it wears longer and better.

STRONGBARN saves you money because it is lighter than 26 gauge conventional roofing yet stronger. Also because Purlins and Girts in new buildings can be spaced further apart than required for conventional galvanized roofing and siding.

**Granite City
Steel
Company**

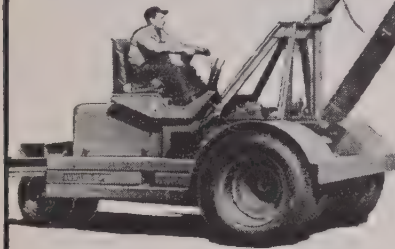
Granite City, Ill.

DALLAS
KANSAS CITY
MINNEAPOLIS
MEMPHIS
MOLINE
ST. LOUIS



KRANE KAR Loads and Unloads freight cars, trucks, trailers; Stores materials; expedites Plant Maintenance. Often cuts cost of handling loads to 8c a ton.

No Mobile Crane made today can match **KRANE KAR** speed, safety, and economy of operation... picking up, carrying, and placing loads... anywhere, in plant or yard... uneven terrain, congested areas, low overhead, up and down ramps.



KRANE KAR handles loads at Sides as well as at Front.

KRANE KAR
MOVES LOADS
EASIER - FASTER -
SLASHES COST OF
MATERIALS HANDLING

Gas or Diesel. Pneumatic or solid rubber tires; 9 to 37 ft. booms or adjustable telescopic booms; Electric magnet, clamshell bucket, and other accessories available. Ask for illustrated Bulletin No. 79.

USERS: General Motors, Bethlehem Steel, Boeing, Pullman-Standard, Lima Locomotive, Carnegie-Illinois, U. S. Steel, Basic Magnesium, etc.

THE ORIGINAL SWING-BOOM MOBILE CRANE
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER
1½, 2½, 5, AND 10 TON CAPACITIES

KRANE KAR
TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 851 63rd ST., B'KLYN 20, N. Y.

unusual UTILITY...

HALLOWELL

ready-made

WORK BENCHES OF STEEL

The serviceable, ready-made "Hallowell" Work Benches of Steel are ideal equipment for modern shops. "Hallowell" Benches have smooth, long-wearing steel tops, are also available with heavy, high-grade laminated wood tops—or steel tops covered with "Tempered Presdwood." Made in 4 standard heights, 3 widths and 7 lengths, the "Hallowell" can be arranged as individual units, or can easily be re-arranged to form a continuous work bench—a money saving feature, not practicable with "nailed-together" wooden benches. The "Hallowell" does not require costly bolting to the floor.

Write us for the name and address of your nearest "Hallowell" Industrial Distributor and your copy of the "Hallowell" Catalog.

OVER 46 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNSYLVANIA

BOX 523

CHICAGO • DETROIT • ST. LOUIS • SAN FRANCISCO

Reports New Members

Cleveland

• • • Ten new members of American Steel Warehouse Assn., Inc., have been announced by Walter S. Doxsey, president of the association.

New members are:

Comstock Steel and Supply Inc., 405 South 7th St., Phoenix, Ariz.

Comstock Steel and Supply, Inc., 1501 North 15th Ave., Tucson, Ariz.

Morris, Wheeler & Co., Inc., Fox St. and Roberts Ave., Philadelphia.

J. B. Booth & Co., 216 General Robinson St., N. S., Pittsburgh.

Hanover Steel Corp., 651 Lehigh Ave., Union, N. J.

Atlantic Steel Co. (warehouse division), 1365 Mecalain St., N. W., Atlanta 1, Ga.

Marshall Wells Company, 1258 First St., South, Seattle, Wash.

United States Steel Supply Co., 1331 3rd Ave., Room 402, Seattle, Wash.

Gilmore Steel & Supply Co., Swan Island, Portland 18, Ore.

United States Steel Supply Co., 2345 N. W. Nicolai St., Portland 10, Ore.

Opens Books for Orders

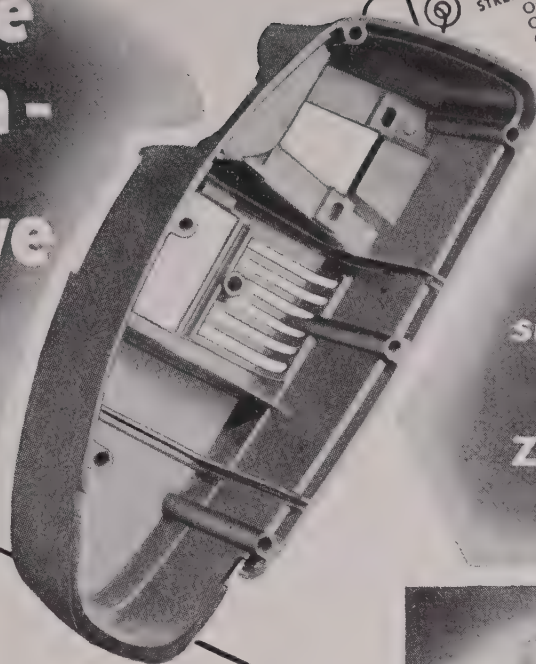
Oakland, Calif.

• • • Permanente Products Co., sales organization for the Permanente Metals Corp., announced last week that it has opened its books for orders to be delivered after the fourth quarter of this year for aluminum wire and cable, to be produced at its Newark, Ohio mill.

Aluminum cable, steel reinforced, is expected to get into production during the fourth quarter at an increasing rate. The initial quarterly production is estimated at 15 million lbs of conductor.

With the heavy demand for the products of the Trentwood aluminum rolling mill and the power limitations restricting full production at the Mead reduction plant, there has been some conjecture as to the sources of aluminum ingots to be used at Newark. The company has announced that plans have been completed to increase its primary aluminum capacity before the end of this year, but has not indicated where this expansion is to take place.

one-piece for design - impressive savings



SIZE—8½" x 3¾" x 3½"
WEIGHT—1 lb., 6 oz.
WALL THICKNESS—.066" avg.
CORING—Ventilating slots and all other openings
cored in the casting operation.
STRENGTH OF THE ALLOY—
Over 40,000 psi tensile
Over 40 ft.—lb impact—½" square bar
(Strength values determined on test bars)

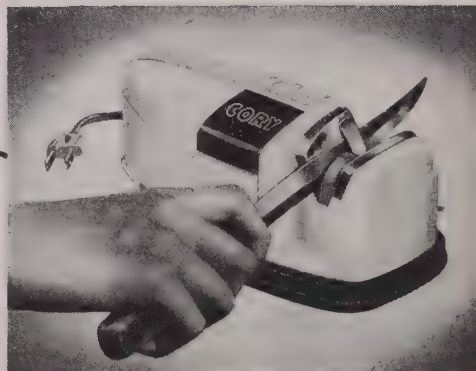
another
successful product
designed for
ZINC DIE CASTING

This one-piece housing for the Cory electric knife sharpener—a highly popular new home appliance—is a masterpiece of the die casting art. It embodies just about all of the qualities that can be obtained in a zinc die casting.

In addition to the pertinent details given on the tag above, your attention is called to the following features of this zinc die casting:

1. Recesses, channels, projections and bosses have been integrally cast to facilitate accurate, rapid assembly of component parts;
2. Decorative beading and lettering are cast on the exterior of the housing for improved appearance at low cost;
3. A sturdy, yet light-weight construction is achieved through thin wall sections with properly located strengthening elements;
4. The smooth as-cast surfaces of the casting require little preparation prior to the application of a gleaming baked white enamel.

This knife sharpener is just one of many successful applications for zinc die castings in the field of household appliances. Typical applications in other major industries will be covered in future advertisements in these pages.



SEND FOR THIS BOOKLET →
ZINC DIE CASTINGS
in ever widening fields

A new booklet—just off the press—has 64 pages of photographs depicting zinc die castings in the assembly of a wide variety of products in many fields. Send for your copy today!



ZINC
FOR DIE CASTING ALLOYS

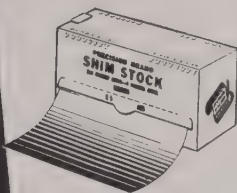
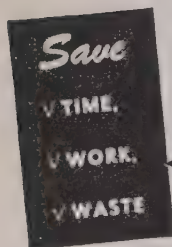
THE NEW JERSEY ZINC COMPANY, 160 Front St., New York 7, N. Y.

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

**"it DOES make
a Difference..."**

what SHIM STOCK YOU USE

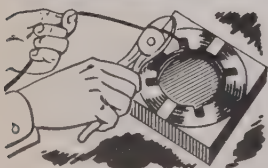


Specify

PRECISION BRAND

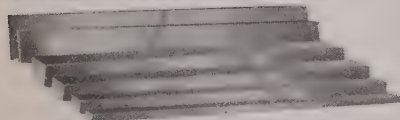
Prove to yourself that you can *save* and get better results with the right shim stock when you can be sure of uniform quality, guaranteed accuracy, convenient protective packaging with Precision Brand. Select from a complete line — Brass Shim or Shim Steel in Dispenser Cartons; Four-in-One Assortment or Flat Packets of Die Cut. Send for Catalog Sheet.

EASY-TO-USE MUSIC WIRE



Just pull, cut, replace end! It's a time-saving dispenser carton for top quality Music Wire, available on immediate delivery in thicknesses .004" to .180". Also in bulk.

GROUND FLAT STOCK



A complete line in both oil and water hardening types, precision ground to within .001"—ready for scribing, shaping, tempering, drawing. Each piece oiled, wax wrapped in protective envelope; marked with size, heat treatment.

CONSULT YOUR JOBBER

GROUND FLAT
STOCK

DRILL ROD
SHIM STEEL

BRASS SHIM
MUSIC WIRE

THICKNESS
GAUGE STOCK



PRECISION STEEL WAREHOUSE, INC.
MANUFACTURING DIVISION
4409 WEST KINZIE ST., CHICAGO 24, ILL.

NEWS OF INDUSTRY

Will Occupy New Plant

Los Angeles

• • • Preco Inc., manufacturers of railroad specialties, earthmoving equipment and farm equipment, will occupy a 51,000 sq ft factory at 6300 E. Slauson Avenue, Los Angeles, about June 1. According to C. T. Hill, corporation president, the new facilities will house the national headquarters and within the next 2 years operations of the corporation's South Gate plant will be combined at the new location.

Wants to Buy Streetcars

Detroit

• • • The Detroit Street Railway, which a short time ago planned to abandon all rail lines, now wants to buy 120 modern streetcars for the system and to institute trolley coach service. Plans call for the purchase of 136 trackless trolleys.

Fred P. Sisson, president of the DSR Commission, said the commission would request permission to borrow \$7 million for the new equipment.

Copper Tariff Suspended

Washington

• • • Import taxes on copper will be suspended for another year, if legislation (H.R. 2313) now being considered by the House ways and Means Committee becomes law.

The bill, which is sponsored by Representative Mills, D., Ark., provides that the import tax imposed under Section 3425 of the Internal Revenue Code shall not apply with respect to articles (other than copper sulfate) entered for consumption or withdrawn from warehouses for consumption during the period beginning Apr. 1, 1949, and ending Mar. 31, 1950.

Portsmouth Reports Net

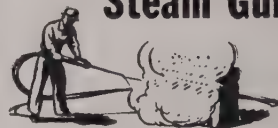
Cleveland

• • • Portsmouth Steel Corp.'s net earnings in 1948, after all charges, amounted to \$4,511,550, or \$3.54 a share, according to preliminary figures reported. This compares with 1947 net earnings of \$3,944,969, or \$3.03 per share.



**"The big parts
are ready...
we cleaned 'em
with the**

**OAKITE
Steam Gun!"**



HERE'S an easy, low-cost way to clean metal parts that are too large to be soaked in tanks or conveyed through washing machines!

Just use the Oakite Solution-Lifting Steam Gun to apply an Oakite cleaning solution under about 40 pounds of steam pressure. Oil, grease and other dirt leave metal surfaces in a hurry.

Also Strips Paint

Paint and other organic coatings disappear when the same Oakite Steam Gun is used to apply an Oakite stripping solution under low pressure.

After the Oakite Steam Gun treatment, large metal parts are ready for inspection, assembly, further machining, overhaul or repair. A subsequent Oakite conditioning process effectively prepares the metal for painting or similar finishing.

FREE

Write to Oakite Products, Inc., 30H Thames St., New York 6, N. Y., for illustrated folder F7338 containing more information about Oakite Solution-Lifting Steam Guns and the many cleaning operations on which they are used with substantial savings in time and money.

OAKITE



SPECIALIZED INDUSTRIAL CLEANING
MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in
Principal Cities of United States and Canada



LONDON and BIRMINGHAM

BRITISH INDUSTRIES FAIR



Britain has long been the world's greatest customer, and has led the way in the export of manufactured products. By initiative in modern research, and from experience of commerce with other nations, her industrial production has become greater and more varied than ever in history.

Renowned for the quality of her work, Britain has applied new technique to her famous industries. By enterprise in fresh markets she has achieved record deliveries, and export production still expands. To keep in touch with these develop-

ments great numbers of the world's principal buyers are making visits to Britain.

Every year, from over 100 countries, trade buyers gather at the British Industries Fair. The Chamber of Commerce in Birmingham, and manufacturers from every part of Britain, join with the British Government to welcome them.

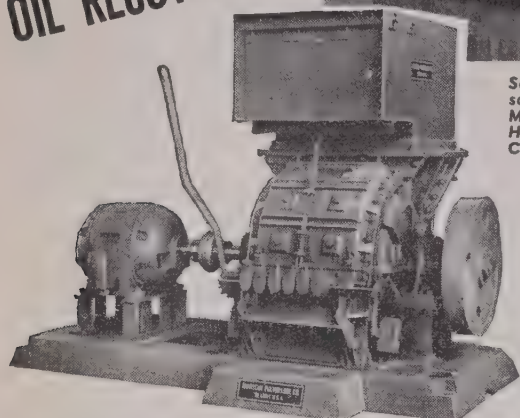
At BIF 1949, from 2-13 May, three thousand exhibitors will display the latest developments in thirty groups of allied trades. The leading men of international commerce are invited to attend the world's greatest assembly of national products.

2-13 MAY 1949

TRADE BUYERS—PLAN YOUR VISIT NOW

Information about exhibitors, special displays and facilities at the Fair can be obtained from the nearest British Embassy, Legation or Consulate.

**TOP SCRAP VALUE
and
TOP CUTTING
OIL RECOVERY**



Send for bulletin on
"Crushing Turnings Profitably".



Segregated turnings being fed to special square hopper of an American #2400 Metal Turnings Crusher powered by 50 HP 900 RPM motor. Crown Cork & Steel Co., Baltimore.

The AMERICAN METAL TURNINGS CRUSHER

Long, curly turnings of steel, alloys, brass, aluminum, etc., are rapidly reduced to easily-handled chips, requiring only a fraction of usual storage space and increasing cutting oil reclamation to 30 to 50 gallons per ton.

Americans soon pay for themselves!

American

PULVERIZER COMPANY

Originators and Manufacturers of
Ring Crushers and Pulverizers

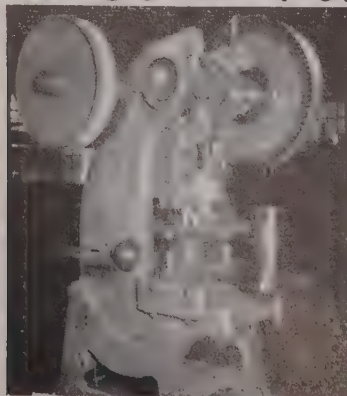
1439 MACKLIND AVE.
ST. LOUIS 10, MO.

Whatever the job

**IF IT CALLS FOR
A PUNCH PRESS**

AN L & J PRESS

CAN DO IT FOR LESS COST!



BLANKING, forming, piercing, drawing, trimming — L & J presses have the stamina and soundly engineered design to provide top output at bottom cost.

In the multiple hole punching operation shown, a manufacturer is keeping production costs to a minimum. In use many years NO repairs whatsoever have been necessary on this L & J Press. And so it goes — cost sheets of users of L & J Presses for all types of operations tell a similar story.

Send for Catalog L-7—see how they're built and you'll see why we say "An L & J can do it perfectly at less cost."

L & J PRESS

C O R P O R A T I O N
Successors to Loshbough-Jordan Tool & Machine Co. Established 1911

1623 STERLING AVE., ELKHART, INDIANA

PERSONALS

(CONTINUED FROM PAGE 126)

• **H. S. Dershimier** has become associated with Macwhyte Co., Kenosha, Wis. as direct factory representative, with headquarters in Tulsa, Okla.

• **Donald W. Graham** has been appointed district sales manager of the heavy chemicals division of the Pennsylvania Salt Mfg. Co., Philadelphia, in charge of the Cincinnati sales office. Mr. Graham, who has been in charge of Pennsalt's St. Louis office for many years, succeeds C. W. Dermitt, who has resigned.

• **George R. Brockway** has been elected vice-president in charge of sales for the Rapids-Standard Co., Inc., Grand Rapids. **Wendell A. Smith** has been elected assistant secretary-treasurer. Mr. Brockway has served six years with Rapids-Standard and previous to his election as vice-president had been general sales manager. Mr. Smith joined the company in 1946.

• **Dr. L. M. Winn** has retired as medical director of the U. S. Pipe & Foundry Co. plant at North Birmingham, Ala., after serving at the plant for 30 years.

• **M. H. Corbin** became president of the Standard Varnish Works of New York and **E. E. Day**, president of the Standard Varnish Works of Illinois, both men succeeding **J. Heath Wood**, who has been elected chairman of the boards. Mr. Corbin has been with the company for 11 years and has been vice-president and director for the last four years. Mr. Day has been with the company since 1920 and has served as a vice-president and director of the New York corporation and executive vice-president and director of the Illinois company. Mr. Wood has been president of the New York firm for 18 years and the Illinois firm for 24 years.

• **T. F. George** has been appointed district sales representative for the Sawhill Mfg. Co., Sharon, Pa., servicing western Pennsylvania, Ohio and West Virginia. Mr. George had recently been associated with the Stambaugh-Thompson Co. and the Youngstown Sheet & Tube Co.

Lundberg Screw Products Co. makes
better studs at lower cost with

J&L ELECTREAT COLD-FINISHED
STEEL BARS

**J&L
STEEL**



Cutting precision threads on J&L Electreat Steel with a two-spindle threader at Lundberg Screw Products Co., Lansing, Mich.

Steel costs are reduced 20% to 30% . . .

Heat treating of finished studs is eliminated.

Steel studs made by Lundberg for such equipment as truck axles, farm implements and diesel locomotives, must be made to exact specifications.

By using J&L *Electreat* cold-finished bars to replace higher-cost alloys, such as chrome-molybdenum and chrome-nickel-molybdenum, Lundberg not only meets the customer's specifications but also obtains *two savings*: *Steel costs are reduced*, and the *nuisance and expense of heat treating is eliminated*.

In addition—finished studs are of better quality. They are free from scale and distortion caused by "batch" heat treating. They have clean, sharp threads. Inspection rejects are reduced.

Each bar of J&L *Electreat* cold-finished steel is individually heat treated at the mill by the electric-induction process under exacting control. The flexibility of heat control in the *Electreat* process permits "tailor-made" combinations of surface and core properties to fit *your* requirements.

Many fabricators of gears, couplings, bolts, nuts, shafts and other steel parts take advantage of these money-saving qualities of J&L *Electreat*. The booklet, "New J&L *Electreat* Heat-Treated, Cold-Finished Steel," compares the properties obtained by the *Electreat* process with conventional "batch" heat-treatment and points the way to greater profits. Let us send you a copy.



Jones & Laughlin Steel Corporation
403 Jones & Laughlin Building
Pittsburgh 19, Pennsylvania

Please send me a copy of "New J&L *Electreat* Heat-Treated, Cold-Finished Steel."

Do you recommend *Electreat* for:

NAME _____
COMPANY NAME _____
ADDRESS _____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY and JALLOY (hi-tensile steels).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

Eliminate

BY THE CUBIC FOOT

OXYGEN

BY THE TON

WASTE and WORRY

For an adequate oxygen supply at all times, without a capital investment for equipment on your part, make your own oxygen from air. Here are some of the advantages you get with an Air Products Oxygen Generator, if you use over 200,000 cu. ft. of oxygen per month—

✓ **NO WASTE**—no evaporation loss—you can use *all* of the oxygen you buy when you make your own this easy way.

✓ **NO DELAY**—your oxygen supply is always *in your plant* when you lease Air Products Generators. You eliminate the high cost of handling and delivery.

✓ **LOWER COSTS**—your oxygen will cost less, and operating Air Products Generators is simple, requires very little time.

These same generators also produce high-quality nitrogen gas.

To Figure Your Savings

in solving your oxygen supply problems this easy way, let us know how much oxygen you use per month, giving minimum and peak loads. We will give you the information you need to make a decision. Write us today, at no obligation.

AIR PRODUCTS, INC.
P. O. Box 538
Allentown, Pa.

Assure Your Supply at low cost with

Air Products

OXYGEN GENERATORS

• **Norman J. Leary** has been appointed manager of industrial sales and service, Circo Products Co., Cleveland.

• **Robert J. Huelsman** has been appointed to the Chicago sales department of the Billings & Spencer Co., Hartford.

• **E. M. Slonaker**, district sales manager for the Willard Storage Battery Co., Chicago, has been named to direct the company's related products division. Mr. Slonaker joined the company in 1926. He has his headquarters in the Cleveland office of the company. **Charles H. Meyer**, succeeds Mr. Slonaker in Chicago. Mr. Meyer who joined Willard in 1917, had previously served as Kansas City district sales manager. **J. R. Carlisle** has been named to succeed Mr. Meyer in Kansas City. Mr. Carlisle started his Willard career as district sales representative in 1927, later serving as office manager and industrial representative in Kansas City.

• **Sam L. Brous** has been appointed marketing manager of the chemical department of General Electric Co., Pittsfield, Mass. Mr. Brous formerly headed the chemical sales department of B. F. Goodrich Chemical Co. in Cleveland. **James W. Reynolds**, former vice-president and director of the Sun Chemical Co. of New York, has joined the G. E. chemical department as sales manager of silicone products, with headquarters in Waterford, N. Y.

• **Glenn Logan** has been named special representative in Atlanta of the Cleco Div., Reed Roller Bit Co., Houston.

• **L. B. Taylor** has been named domestic sales manager for Friden Calculating Machine Co., Inc., San Leandro, Calif. Mr. Taylor formerly served as eastern division field manager.

• **E. Kent Swift**, chairman of the board of Whitin Machine Works, Whitinsville, Mass., has been elected chairman of the board of Seaboard Foundry Inc., Providence. **J. Hugh Bolton**, president of Whitin Machine and **C. A. Slicher**, **D. C. Lash** and **L. M. Fuller** were elected members of the board.

WAREHOUSE STOCKS OF

ALLOY BARS

ROUNDS
SQUARES
HEXAGONS

Hot Rolled.
1/2" to 10" Rd.

Cold Drawn.
1/8" to 4 1/2" Rd.
3/16" to 2" Sq.
3/8" to 2 1/2" Hex.

AIRCRAFT

AMS—6260
6270
6272
6280
6322
6324
6415
6320 Hex.

BESSEMER

B1113

CARBON

1045 H.R.

FORGINGS

WRITE FOR
OUR MONTHLY
STOCK LIST

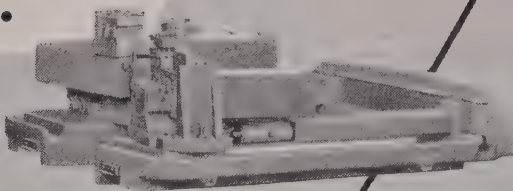
HY-ALLOY STEELS CO.

30 N. LASALLE
CHICAGO 2, ILL.
RAN 5253

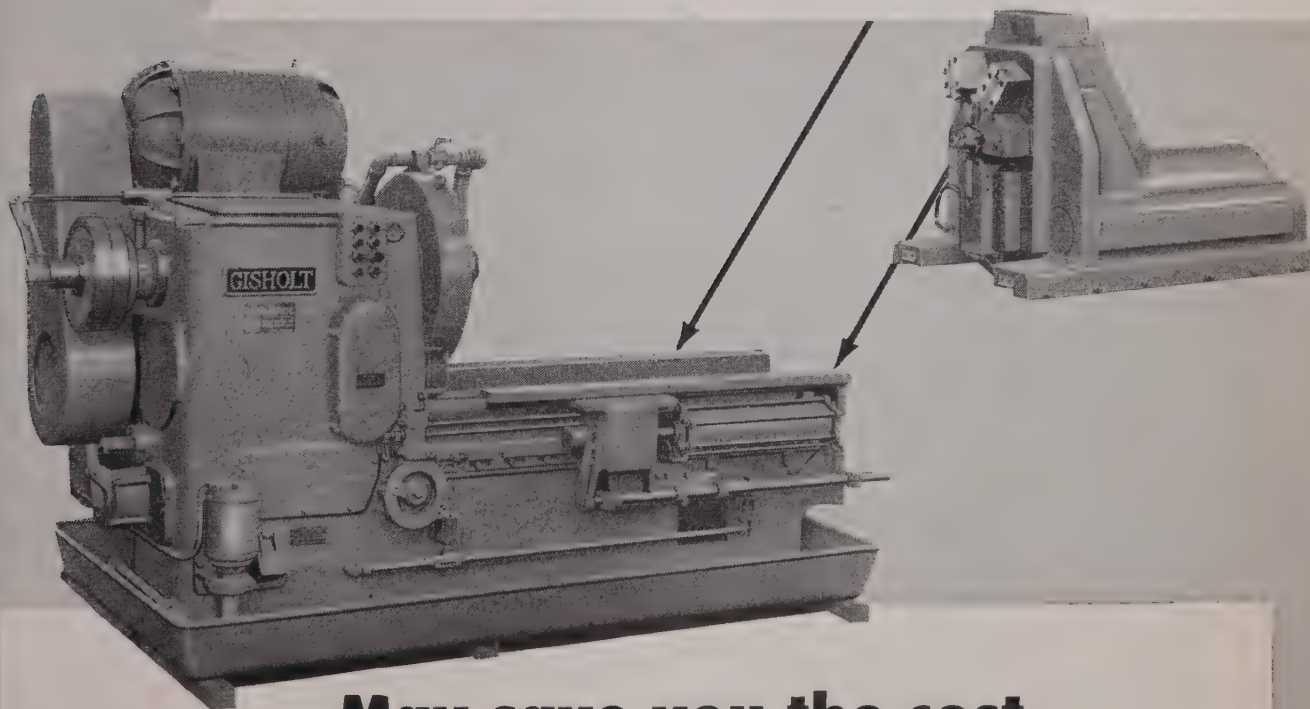
THE GISHOLT SIMPLIMATIC

AUTOMATIC LATHE

THIS PLATEN TABLE...



...OR THIS PLUNGE AND RADIAL HEAD



**May save you the cost
of a special machine... *Investigate it!***

THE SIMPLIMATIC—An automatic, single spindle, chucking lathe—adaptable to a wide variety of work that is produced in quantity.

— **with PLATEN TABLE** it provides a horizontal mounting using various tool slide arrangements for straight and angular turning, boring and facing cuts.

— **with PLUNGE AND RADIAL HEAD** it provides vertical tool mounting in front of the work with a minimum tool overhang; for combined operations on parts of large diameter with wide faces.



THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Current Order Pattern Spotty; Few Firms Equal December Volume

• • • For most segments of the machine tool industry, the news for the past week promised a future about as spotty as the present new firm order pattern, which is another way of saying that perhaps one third of the industry is surpassing December volume, and the other two thirds are battling equally hard, but with less desirable results.

In Chicago, Paul G. Hoffman, ECA administrator, told the Inland Daily Press Assn. that European production has risen to prewar levels, and countries participating in the Marshall Plan are through the first phase of economic recovery. Output of mines and factories, he added, was 14 pct above 1947 last year and steel output, except in Western Germany, is currently exceeding the prewar high of 1937 and is 25 pct above 1947.

Mr. Hoffman's remarks could obviously imply a good many things, including a premature end or curtailment of the ECA machine tool program. On the other hand, companies report that ECA orders are coming in, but not in the volume expected. Company spokesmen point out that European production may be normal, but perhaps something more than normal is needed.

In Washington, leading business economists warned that favorable Congressional action on administration demand for higher corporate taxes would seriously curtail business investment in new plant and equipment. George Terbough, Machinery Allied Products Institute, told the Congressional Joint Economic Committee that higher corporate taxes would reduce business investment volume more effectively than any other policy.

Also in Washington, ECA announced a new system, especially adaptable to small transactions, by which ERP countries may make quick payment to American

European Output at Prewar; First Phase of Recovery Now Seen Completed

• • •

suppliers for items purchased under ECA financing. The system does not involve payment of interest fees or exchange. It eliminates correspondence and book-keeping and enables nations whose dollar balances are small to make payments without depleting these balances, while awaiting reimbursement by ECA. Spare parts come under this category.

Machine tool trade in Chicago continues to be optimistic about 1949 business. Makers of special machinery are doing much better than they did for the same period last year. Even the standard tools are moving in fair volume although countrywide, some areas are spotty. Large manufacturers of milling machines report Detroit business is just fair, Chicago about the same, but the Cleveland and Pittsburgh areas are quite good. They expect no further price increases, unless they get a healthy labor boost when the contracts are negotiated again early this summer.

One large maker of special lathes and boring mills in the Chicago area reports that their order volume on special machinery so far this year is twice as good as last. They expect further that European business through the World Bank and ECA will even double their present volume. The Fiat Automotive Co., in Italy, has been placing a very large volume of orders which the machine tool makers in this area expect to get very soon. A good business has been going on with Swiss manufacturers and the automotive plants of France are very active on inquiries, although in this case the dollar shortage is still a problem.

Standard lines of boring mills,

lathes, broaching machines, milling machines, etc., can usually be secured in this area on a 30-day maximum delivery. Special tooling and special setups, however, on the special machinery mean that most makers cannot complete delivery of an order placed today before 8 to 12 months.

Additional business is expected out of Detroit as General Motors Corp. increases the application of Dynaflo to other models and installs Kettering engines in more cars.

Some machine tool makers in Chicago report a favorable turn in the tide as far as costs are concerned. All companies have been driving to get costs as low as possible so as to preclude customer price resistance. The good news came about 3 to 4 weeks ago when some foundries in the midwest cut their price of malleable castings to the machine tool makers by as much as 20 pct. This was expected, as the foundries are scratching for business, the price of cast iron scrap has dropped drastically, and competition for sales is keen.

Machine tool manufacturers say that if the malleable casting price cut stays and all suppliers get in line, they have a very good chance of keeping costs down so that the price spiral can be stopped. This would be particularly true if the foundries making steel castings also lowered their prices. Steel supplies to most of the machine tool makers have been adequate and some of them report that recently they have been offered more tonnage than they can use.

In Cleveland, sale of standard Tool Co. to National Twist Drill & Tool Co. for approximately \$3 million was reported this week. Although the sale will not be concluded until after a meeting Mar. 1, stockholders are expected to approve the action. Sale has already been unanimously approved by the board of directors.

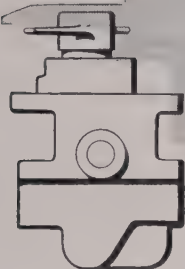
A RAZOR



A LOCOMOTIVE



(A)



AND FAST TABLE TRAVEL

**125 f.p.m. longitudinal table speed
means fast micro-accuracy* production
with GRAND RAPIDS GRINDERS**



Fast longitudinal table travel — *the fastest available in any grinder* — is an important reason why you find Grand Rapids Grinders in so many leading plants. Such rapid operation makes possible high-speed, accurate production . . . of small mass-produced razor parts, as well as massive locomotive sub-assemblies. This high-speed table travel is achieved by a specially designed control valve (A) and vane type hydraulic pump. The special control valve changes the flow direction of the hydraulic

fluid to rapidly reverse the table travel. The pump is operated by a separate motor, which is entirely independent of the spindle drive. And you get these other assurances of long-life speed and accuracy in Grand Rapids Grinders: vibrationless rigidity achieved by massive one-piece column and base casting; patented vertical head adjustment; flanged-type, pre-loaded ball bearing spindle; powered vertical travel of wheel head; and Bijur, one-shot lubricating system.

* Accuracy within 0.00025 limits

TO SERVE YOU — *Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter Grinders, Hand Feed Surface Grinders, and Combination Tap and Drill Grinders.*



200 Straight Ave., S. W., Grand Rapids 4, Mich.

GRAND RAPIDS GRINDERS

Foreign Producers' Price Views a Factor in Domestic Market

New York

• • • Buying pressure on the metal markets has been eased appreciably in the last month or so, largely because of the industrywide trend toward reduction of inventories. Consumers sometimes find themselves so short of metal that they must ask producers to make a special effort to ship in the first few days of the month in order to keep the plant going. Basically, market conditions are not greatly changed. Industrial indices have shown no sharp drop in activity. Other market conditions, with exceptions here and there, are relatively unchanged. But consumers are not pressing to buy metal with the same intensity.

The lead market has changed in the short space of three months from one of critical shortages in which heavy premiums were being paid by some consumers to one of adequate supply. The significant slump in the replacement battery market was a factor in this change. The mild winter in the East was reflected in significant curtailment in battery shipments in December and January, reported at 1,905,000 and 1,252,000 units respectively, compared with last year's shipments which were half a million to a million units more.

Secondary lead can now be bought as low as 19.5¢ per lb, 2¢ under the primary price. Scrap prices have been reduced week after week as smelters found it more and more difficult to move their production. The most recent range of smelting charges quoted is from \$100 to \$130 a ton. However some smelters are not interested in lead scrap at any price.

Buying Pressure Eases Since Industry's Trend Toward Inventory Reductions

• • •

The possibility of a price decline in the primary market under present circumstances hinges on the action of foreign producers. If the market continues to contract, will foreign producers be willing to drop their price considering the high ocean freight costs involved? Domestic requirements under any circumstances would be greater than could be supplied from domestic production alone.

The zinc market is still in short supply. Consumers have reduced their inventories, sometimes involuntarily. It is often necessary for them to request immediate delivery. Unfortunately smelters do not have more than even the barest minimum working inventories and have not had them for the last five years. If there should be some easing in the zinc market, the question of what reduction foreign producers would be willing to accept would also be significant in determining the domestic price. At present, duty on zinc is applicable.

The position of copper has improved some due to the lighter demands of the brass mills for metal due to their reduced order volume. A check of the mill order position reveals that there has been no important improvement in recent weeks. It is still spotty, with heavy-

est current demand for tube mill products for the automobile and building industries.

The suspension of the Bingham Canyon, Utah strike pending arbitration of the wage differences has not yet been productive of refined copper. It is not expected that copper will be available for consumption from this mine for another two months. There is also the remote possibility that arbitration may not be completely successful.

Scrap Stocks Drop

Toronto

• • • Stocks on nonferrous scrap metal in Canada at the end of December were lower than in the same month a year ago, amounting to 1203 tons compared with 1283 tons at the close of 1947.

Amount purchased or received during the month was 1987 tons while total used or sold in December aggregated 1876 tons.

Sees No Depression

Buffalo

• • • The possibility of a sharp decline in business or a depression is remote, even though general business activity may slacken somewhat this year, President Charles H. Diefendorf, of the Marine Midland Corp., declared. He said he regarded the Government armament and foreign-aid programs as "cushions" against any serious declines.

Buffalo Bolt Dividend

Buffalo

• • • Buffalo Bolt Co. has declared the regular quarterly dividend of 37½ cents a share on the common stock, payable March 10 to holders of record Feb. 25.

Nonferrous Metals Prices

	Feb. 16	Feb. 17	Feb. 18	Feb. 19	Feb. 21
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be	
dollars per lb contained Be	\$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	\$52.00
Cadmium, del'd	\$2.00
Cobalt, 97-99% (per lb)	\$1.65 to \$1.72
Copper, electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$110 to \$115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$86 to \$88
Nickel, electro, f.o.b. New York	42.93
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$89 to \$93
Silver, New York, cents per oz.	71.50
Tin, Grade A, New York	\$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.198
Zirconium copper, 10-12 pct Zr, per lb contained Zr	\$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	19.00*
No. 120	18.50*
No. 123	18.00*
80-10-10 ingot	
No. 305	27.25
No. 315	24.25
88-10-2 ingot	
No. 210	33.00
No. 215	31.00
No. 245	23.25*
Yellow ingot	
No. 405	16.50*
Manganese bronze	17.50
No. 421	23.00
* F.o.b. Philadelphia.	

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	26.75-27.50
0.60 copper, max.	26.50-27.00
Piston alloys (No. 122 type)	23.00-23.75
No. 12 aluminum (No. 2 grade)	22.00-22.75
108 alloy	23.00-23.50
195 alloy	23.50-24.00
13 alloy	26.50-27.50
AXS-679	23.25-24.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	24.25-24.75
Grade 2—92 pct-95 pct	22.50-23.00
Grade 3—90 pct-92 pct	22.25-22.75
Grade 4—85 pct-90 pct	22.00-22.50

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40½
Electrodeposited	34½
Rolled, oval, straight, delivered	37.34
Ball anodes	38½
Brass, 80-20	
Cast, oval, 15 in. or longer	35½
Zinc, oval, 99.99	
Ball anodes	20.50
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	\$2.10
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	20.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls, frt. allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to \$1.07; 35 to 37, 45.7¢ to \$1.65; 47 to 49, 67.5¢ to \$2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.6¢ to 32¢.

Screw Machine Stock: Drawn, ¼ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ¾ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ¾ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2½ to 3¾ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSA, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-\$1.01; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft. for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft. per. up to 5.9 in., 61¢; 0.50 to 0.59 lb per ft. per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft. per. up to 19.5 in., 44¢; 4 to 6 lb per ft. per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ to 5/16, \$1.14; 5/16 to ¾, \$1.02; ¾ to ¾, 76¢; 1 to 2 in., 66¢; 0.065 to 0.082, ¾ to 7/16, 85¢; ¾ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ¾ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	48
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78		37.18
Copper, hot-rolled		33.03	
Copper, drawn		34.28	
Low brass	38.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass		29.24	
Commercial bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculey, Olympic, etc.	40.49	40.76	41.82
Nickel silver, 10 pct		47.17	44.77
Architectural bronze	33.42		
* Seamless tubing.			

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turnings
Copper	21½	20½
Yellow brass	18½	18½
Red brass	20	19½
Commercial bronze	20½	19½
Manganese bronze	18½	17½
Leaded brass rod ends	18½	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.50-19.75
No. 2 copper wire	18.50-18.75
Light copper	17.50-17.75
Refinery brass	17.25-17.50

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper, wire	19.00
No. 2 copper, wire	18.00
Light copper	17.00
No. 1 composition	14.00-14.50
No. 1 comp. turnings	13.75-14.25
Rolled brass	12.25-12.75
Brass pipe	13.25-13.75
Radiators	13.75-14.00
Heavy yellow brass	12.00-12.25

Aluminum

Mixed old cast	14.25-14.50
Mixed old clips	14.25-14.75
Mixed turnings, dry	13.50-13.75
Pots and pans	14.50-15.75
Low copper	17.75-18.25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	17½-18½
No. 2 heavy copper and wire	16½-17½
Light copper	15½-16½
Auto radiators (unsweated)	10½-11
No. 1 composition	12½-13
No. 1 composition turnings	12½-12½
Clean red car boxes	10½-11
Cocks and faucets	10½-11
Mixed heavy yellow brass	7½-8½
Old rolled brass	10½-11
Brass pipe	11½-12
New soft brass clippings	15-15½
Brass rod ends	11½-12
No. 1 brass rod turnings	8½-9

Aluminum

Alum. pistons and struts	6½-7
Aluminum crankcases	10-10½
2S aluminum clippings	14-14½
Old sheet and utensils	10-10½
Borings and turnings	5-5½
Misc. cast aluminum	10-10½
Dural clips (24S)	10-10½

Zinc

New zinc clippings	10½-11
Old zinc	9-9½
Zinc routings	5½-5¾
Old die cast scrap	5½-6

Nickel and Monel

Pure nickel clippings	22-23
Clean nickel turnings	17-18
Nickel anodes	22-23
Nickel rod ends	21-22
New Monel clippings	16½-17½
Clean Monel turnings	11-12
Old sheet Monel	13-14
Old Monel castings	11-12
Inconel clippings	13-14
Nickel silver clippings, mixed	8-8½
Nickel silver turnings, mixed	7-7½

Lead

Soft scrap lead	14½-15
Battery plates (dry)	7-7½

Magnesium Alloys

Segregated solids	8-9
Castings	4½-5½

Miscellaneous

Block tin	82-84
No. 1 pewter	65-67
No. 1 auto babbitt	51-53
Mixed common babbitt	16-16½
Solder joints	20-21
Siphon tops	50-52
Small foundry type	18-18½
Monotype	17-17½
Lino. and stereotype	16-16½
Electrotype	14-14½
New type shell cuttings	15-15½
Hand picked type shells	6-6½
Lino. and stereo. dross	8½-9
Electro. dross	6-6½

At your service



GENERAL OFFICES

33 North LaSalle Street, Chicago, Ill.

Telephone: Franklin 2-0380

Prices Still Drop But Gradually Taper

New York

••• Price drops this week leveled off considerably. This does not indicate that anyone knows what's going on or what's going to happen. There have still been no major sales and as long as mills stay out of the market there can be no true yardstick for price quotations.

The heavy melting prices held in all major market areas except Philadelphia where No. 1 slid off \$1. This drops THE IRON AGE scrap composite price to \$37.25, lowest since the summer of 1947. No. 1 also dropped in several of the minor market areas as it leveled off with major markets.

Cast grades continued weak and corresponding drops in practically all areas were recorded. However, this week's declines were not as great as those that have been taking place in recent weeks. Railroad specialties were also weak with price drops common.

In Buffalo, a major factor came back into the market with a substantial purchase of No. 2 heavy melting at the quoted \$35 a ton price which stabilized the market in that grade considerably. This consumer, however, also bought a substantial tonnage of No. 2 bundles at \$3 under the No. 2 price, or at \$32.

Although not prevalent in all other districts, there is considerable feeling that this differential may become common in other areas as long as the market maintains its current inactivity. A \$1 differential has been in effect in Philadelphia between No. 2 heavy melting and No. 2 bundles for about a month.

PITTSBURGH—Weakness in turnings and cast grades dominated the market during the past week. Short shoveling turnings are quotable at \$30 to \$31, a \$4.50 drop from the last sale, or a \$3 drop in THE IRON AGE quotation from the previous week. Other turnings were proportionally weaker. The turnings market is confused by existence of old orders running as late as April, some as high as \$38 a ton. While crushers are prepared to pay \$27 to \$28 for machine shop turnings they won't risk a big purchase. Activity in cast grades picked up enough to record substantial drops during the past week though no big tonnages are being bought, sold or offered.

Rails and railroad specialties are off by \$1. There are efforts to bid down the price of railroad heavy melting steel but its high quality has held it up so far.

CHICAGO—Last weeks market was exceptionally flat. A few distress sales took place at prices below those representative of last mill sales. The volume of scrap being collected and going into dealers yards is still shrinking. Bad weather is only part of the reason for this. Dealers aren't anxious to take it in, and collectors aren't so willing to go so far to get it now that prices have fallen. Some observers predict lower prices are a certainty. Others believe the market will firm in March and prices may bounce back quickly if the present operating rates are still in effect.

PHILADELPHIA—There were further declines in the scrap market here last week. No. 1 melting is being bought by brokers at \$38 to fill old orders. The turnings market is down another 50¢. Further reductions were made in cast grades. Mills and foundries are still generally out of the market. Tonnages being placed are small. Mills, still operating at a high rate, are able to meet their requirements from inventories, shipments on old orders and foreign receipts. The Reading list closing this week is small, listing only 24 cars.

CLEVELAND—Reflecting reported sales at lower prices in other districts, the scrap market here and in the Valley was staggering around this week trying to find the bottom. Mills have a few old orders out, and while the broker and dealer buying prices are coming down, trade sources allege that mills in the Northern Ohio area have bought the past month more than 150,000 tons at various sagging price levels, which suggests that some major consumers are in the market on a small scale at least. In any event, the exact figures would be interesting. Foundries are buying less and less tonnage as scrap becomes more competitive price-wise with pig iron.

DETROIT—It was evident to close observers here this week that the Detroit scrap market has just about completed an about face since the end of World War II, resuming many of the characteristics that prevailed here prior to the war. For one thing, a growing number of plants are offering scrap lists and the number of items offered is growing. In addition, clean industrial scrap is now commanding a premium whereas during the post-war period this scrap was earmarked and often sold for less than the prices quoted in IRON AGE. No. 1 bundles are an example. If the scrap is to be used for electric furnace melting, it is moving in the low phos classification at a price \$5 over the heavy melting level. Some clean bundles, however, are still moving at only slightly more than heavy melting prices, it is reported. While competition appears to be developing in this segment of the market, weakness is only too ap-

parent in other market items, particularly turnings and cast iron grades.

CINCINNATI—Broker offerings with no takers brought the scrap market here to a new postwar low this week. A few old orders are still out, bulk of which are scheduled to expire March 1. By and large the trade is bearish which is sometimes another way of saying that broker and dealer buying prices are coming down. Brokers sold the mills short but not the foundries. One broker cited as evidence of the weakness of foundry grades the fact that he bought two cars of short rail Feb. 3 and still has them.

NEW YORK—The heavy melting grades slid off another dollar this week despite the fact that there were no sales. Brokers have ceased buying No. 2 at \$29 and have dropped to the \$23 level. Some are probing at \$27. There is little activity in this market with the only sales consisting of small tonnages for prompt delivery to the Pittsburgh area. Everyone is trying to determine where the leveling off point will be. But, there is not enough business around to give any indication as to where it might be. Clean cast chemical borings are still a drug on the market. There are no appreciable sales being made, little demand and the price quoted, which is nominal, slid off another 50¢.

BOSTON—No. 1 heavy melting steel dropped \$2 a ton this week and is quoted at \$29 to \$30 while No. 2 heavy melting, Nos. 1 and 2 bundles and bushelings \$26.50 to \$27. Shoveling turnings fell off \$3 a ton to \$24. Machine shop turnings and mixed borings and turnings were also weaker and are quoted at \$20 to \$21.

BIRMINGHAM—Lack of activity continues here. The big consumers, both mills and foundries, are placing few, if any, orders. Supplies sufficient to last 60 days are reported. The price undertone is weaker.

BUFFALO—The slide of scrap prices was halted last week, at least temporarily, as one of the leading consumers stepped into the market with fair-sized orders for No. 2 steel at \$35. As a result, the whole list steadied at the previous week's quotations with one notable exception. The same consumer bought No. 2 bundles at \$32, establishing this item at \$3 below No. 2 steel and No. 1 bundles. The splitting of bundle prices came as no particular surprise, however, because the purchaser had intimated previously that setting up of a differential would be attempted at the earliest opportunity. Other grades were quiet and unchanged, with no important transactions noted.

ST. LOUIS—Two steel mills came into the market during the week, buying sufficient tonnages for from one third to one half of their monthly requirements at \$4 a ton less than the preceding purchases for No. 2 heavy melting steel, which brought other items down. Not that the mills needed the material, but orders were given simply to give their suppliers something to work on. The foundry grades are not selling.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$38.50 to \$39.00
RR. hvy. melting	42.00 to 44.00
No. 2 hvy. melting	36.50 to 37.00
RR. scrap rails	51.00 to 52.00
Rails 2 ft and under	53.50 to 54.50
No. 1 comp'd bundles	38.50 to 39.00
Hand bldd. new shts.	38.50 to 39.00
Hvy. steel forge turn.	37.50 to 38.00
Mach. shop turn.	27.50 to 28.50
Shoveling turn.	30.00 to 31.00
Mixed bor. and turn.	27.50 to 28.50
Cast iron borings	30.00 to 31.00
No. 1 mach. cast	51.00 to 52.00
Mixed yard cast	44.50 to 45.00
Hvy. breakable cast	41.00 to 41.50
Malleable	54.00 to 55.00
RR. knuck. and cup.	48.00 to 49.00
RR. coil springs	48.00 to 49.00
RR. leaf springs	48.00 to 49.00
Roller steel wheels	48.00 to 49.00
Low phos.	44.50 to 45.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	34.00 to 35.00
No. 2 dealers' bundles	32.00 to 33.00
Bundled mach. shop turn.	26.00 to 27.00
Galv. bundles	27.00 to 28.00
Mach. shop turn.	24.00 to 25.00
Short shov. turn.	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Mix. borings and turn.	24.00 to 25.00
Low phos. hvy. forge	42.00 to 43.00
Low phos. plates	38.00 to 41.00
No. 1 RR. hvy. melt.	38.00 to 39.00
Rerolling rails	46.00 to 48.00
Miscellaneous rails	40.00 to 41.00
Angles & splice bars	40.00 to 41.00
Locomotive tires, cut.	42.00 to 43.00
Cut bolster & side frames	39.00 to 40.00
Standard stl. car axles	56.00 to 58.00
No. 3 steel wheels	41.00 to 42.00
Couplers and knuckles	40.00 to 41.00
Rails, 2 ft and under	46.00 to 47.00
Malleable	41.00 to 48.00
No. 1 mach. cast	40.00 to 44.00
No. 1 agricul. cast	38.00 to 42.00
Heavy breakable cast	36.00 to 40.00
RR. grate bars	32.00 to 33.00
Cast iron brake shoes	33.00 to 35.50
Cast iron car wheels	38.00 to 40.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$32.50 to \$33.00
No. 2 hvy. melting	32.50 to 33.00
No. 1 bundles	32.50 to 33.00
No. 2 bundles	30.50 to 31.00
Mach. shop turn.	22.50 to 23.00
Shoveling turn.	23.50 to 24.00
Cast iron borings	23.50 to 24.00
Mixed bor. & turn.	22.50 to 23.00
Low phos. 18 in. under	41.00 to 43.00
No. 1 cupola cast	48.00 to 50.00
Hvy. breakable cast	39.00 to 40.00
Rails 18 in. and under	51.00 to 52.00
Rails random length	43.00 to 44.00
Drop broken	53.00 to 54.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 2 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	26.50 to 27.00
Nos. 1 and 2 bundles	26.50 to 27.00
Bushelings	26.50 to 27.00
Shoveling turn.	24.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	20.00 to 21.00
C'n cast chem. bor.	28.50 to 29.50
No. 1 machinery cast	39.50 to 40.50
No. 2 machinery cast	37.00 to 38.00
Heavy breakable cast	34.00 to 35.00
Stove plate	36.00 to 37.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	32.00 to 34.00
New busheling	32.00 to 33.00
Flashings	32.00 to 33.00
Mach. shop turn.	21.00 to 22.00
Machinery cast	46.00 to 48.00
Mixed yard cast	41.00 to 43.00
Shoveling turn.	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Mixed bor. & turn.	21.00 to 22.00
Low phos. plate	37.00 to 38.00
Heavy breakable cast	36.00 to 39.00
Stove plate	42.00 to 44.00
Automotive Cast	46.00 to 48.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$38.00 to \$39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	33.00 to 33.50
Mach. shop turn.	30.50 to 31.00
Shoveling turn.	31.50 to 32.00
Mixed bor. and turn.	30.50 to 31.00
Clean cast chemical bor.	34.00 to 37.00
No. 1 machinery cast	43.00 to 45.00
No. 1 mixed yard cast	40.00 to 42.00
Hvy. breakable cast	40.00 to 42.00
Hvy. axle forge turn.	39.00 to 40.00
Low phos. acid openhearth	41.00 to 42.00
Low phos., electric furnace	42.00 to 43.00
Low phos. bundles	39.00 to 40.00
RR. steel wheels	45.00 to 46.00
RR. coil springs	45.00 to 46.00
RR. malleable	47.00 to 48.00
Cast iron car wheels	48.50 to 49.50

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	29.00 to 30.00
Bundled sheets	29.00 to 30.00
Mach. shop turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Locomotive tires, uncut	39.00 to 40.00
Mis. std. sec. rails	42.00 to 43.00
Steel angle bars	42.00 to 43.00
Rails 3 ft and under	46.00 to 48.00
RR. steel springs	41.00 to 42.00
Steel car axles	53.00 to 55.00
Brake shoes	35.00 to 36.00
Malleable	40.00 to 41.00
Cast iron car wheels	50.00 to 52.00
No. 1 machinery cast	46.00 to 48.00
Hvy. breakable cast	39.00 to 40.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$32.50
No. 2 hvy. melting	32.50
No. 2 bundles	31.00
No. 1 busheling	32.50
Long turnings	24.00
Shoveling turnings	26.00
Cast iron borings	26.00
Bar crops and plate	\$37.00 to 37.50
Structural and plate	37.00 to 37.50
No. 1 cupola cast	42.00 to 43.00
Stove plate	40.00 to 41.00
No. 1 RR. hvy. melt.	36.00
Steel axles	54.00 to 55.00
Scrap rails	40.00 to 41.00
Rerolling rails	50.00 to 52.00
Angles & splice bars	40.00 to 42.00
Rails 3 ft & under	40.00 to 42.00
Cast iron car wheels	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$38.50 to \$39.00
No. 2 hvy. melting	37.00 to 37.50
No. 2 bundles	37.00 to 37.50
Mach. shop turn.	30.00 to 31.00
Short shov. turn.	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos.	44.00 to 46.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	28.00 to 29.00
No. 2 bundles	25.00 to 29.00
Mach. shop turn.	22.00 to 23.00
Mixed bor. & turn.	22.00 to 23.00
Shoveling turnings	23.50 to 24.50
Machinery cast	38.00 to 39.00
Mixed yard cast	35.00 to 36.00
Heavy breakable cast	33.00 to 34.00
Charging box cast	33.00 to 34.00
Unstrp. motor blks.	32.00 to 33.00
C'n cast chem. bor.	29.50 to 30.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$39.00 to 41.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	34.00 to 35.00
Mach. shop turn.	29.00 to 30.00
Shoveling turn.	31.00 to 32.00
Cast iron borings	29.00 to 30.00
Mixed bor. and turn.	29.00 to 30.00
Clean auto. cast	47.00 to 49.00
Mixed yard cast	38.00 to 40.00
Stove plate	38.00 to 40.00
RR. malleable	60.00 to 65.00
Small indus. malleable	37.00 to 39.00
Low phos. plate	41.00 to 42.00
Scrap rails	48.00
Rails 3 ft & under	54.00 to 55.00
RR. steel wheels	47.00 to 48.00
RR. coil & leaf spgs.	47.00 to 48.00
RR. knuckles & coup.	47.00 to 48.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$38.00 to \$38.50
No. 2 hvy. melting	36.50 to 37.00
No. 1 bundles	36.50 to 37.00
No. 1 busheling	36.50 to 37.00
Drop forge flashings	36.50 to 37.00
Mach. shop turn.	27.50 to 28.00
Shoveling turn.	29.50 to 30.00
Steel axle turn.	33.00 to 33.50
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	29.50 to 30.00
Low phos. 2 ft and under	42.00 to 43.00
No. 1 machinery cast	48.00 to 50.00
Malleable	53.00 to 55.00
RR. cast	48.00 to 50.00
Railroad grate bars	42.00 to 43.00
Stove plate	49.00 to 50.00
RR. hvy. melting	41.00 to 41.50
Rails 3 ft and under	54.00 to 55.00
Rails 18 in. and under	55.00 to 56.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$25.00
No. 2 hvy. melting	25.00
No. 2 bales	23.00
No. 3 bales	20.00
Mach. shop turn.	15.00
Elec. fur. 1 ft under	\$37.50 to 40.00
No. 1 cupola cast	38.00 to 40.00
RR. hvy. melting	26.00
Rails	26.50

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$25.00
No. 2 hvy. melting	25.00
No. 1 bales	25.00
No. 2 bales	23.00
No. 3 bales	20.00
Mach. shop turn.	15.00
Elec. fur. 1 ft. under	\$32.00 to 38.00
No. 1 cupola cast	38.00 to 45.00
RR. hvy. melting	26.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	\$27.50
Elec. fur. 1 ft and under	\$35.00 to 38.50
No. 1 cupola cast	38.00 to 40.00
RR. hvy. melting	28.50

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point:

Heavy melting	\$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd.	16.00*
Short steel turnings	17.00*
No. 1 cast	\$48.00 to 50.00*
No. 2 cast	44.00 to 45.00*

*Ceiling Price.



"... CASH FOR OLD METAL", Paul Revere

In a public announcement of the establishment of his new foundry in 1792, Paul Revere advertised for old metal. He needed scrap to supplement his limited supply of ores.

This same situation has existed throughout the growth of American industry.

Today that need is increasingly important.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

Main Office

LINCOLN-LIBERTY BLDG.
Philadelphia 7, Pennsylvania

Yards

LEBANON, PA. • READING, PA.
DETROIT (ECORSE), MICH.
MODENA, PA. • PITTSBURGH, PA.



BIRMINGHAM, ALA.
Empire Bldg.
BOSTON, MASS.
Statler Bldg.
BUFFALO, N. Y.
Genesee Bldg.

CHICAGO, ILL.
100 W. Monroe St.
CLEVELAND, O.
1022 Midland Bldg.
DETROIT, MICH.
2011 Book Bldg.

ST. LOUIS, MO.
2110 Railway Exchange Bldg.

Branch Offices

HOUSTON, TEXAS
Cotton Exchange
LEBANON, PA.
Luria Bldg.
NEW YORK, N. Y.
Woolworth Bldg.

PITTSBURGH, PA.
Oliver Bldg.
PUEBLO, COLO.
Colorado Bldg.
READING, PA.
Luria Bldg.

SAN FRANCISCO, CAL.
Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Feb. 22, 1949	Feb. 15, 1949	Jan. 25, 1949	Feb. 24, 1948
(cents per pound)	1949	1949	1949	1948
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron.....	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate:				
(dollars per base box)				
Tinplate (1.50 lb) cokes..	\$7.75	\$7.75	\$7.75	\$6.80
Tinplate, electro (0.50 lb) ..	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90

Bars and Shapes:				
(cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302) ..	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65

Wire:				
(cents per pound)				
Bright wire	4.256	4.256	4.256	3.55

Rails:				
(dollars per 100 lb)				
Heavy rails	\$3.20	\$3.20	\$3.20	\$2.75
Light rails	3.55	3.55	3.55	3.10

Semifinished Steel:				
(dollars per net ton)				
Rerolling billets	\$52.00	\$52.00	\$52.00	\$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	54.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†

Wire rod and Skelp:				
(cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.90

† Gross ton

Pig Iron:	Feb. 22, 1949	Feb. 15, 1949	Jan. 25, 1949	Feb. 24, 1948
(per gross ton)	1949	1949	1949	1948
No. 2, foundry, Phila.....	\$51.56	\$51.56	\$51.56	\$44.61
No. 2, Valley furnace....	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*...	49.46	49.46	49.46	43.28
No. 2, Birmingham.....	43.38	43.38	43.38	37.38
No. 2, foundry, Chicago†	46.00	46.00	46.00	39.00
Basic del'd Philadelphia*	50.76	50.76	50.76	44.11
Basic, Valley furnace....	46.00	46.00	46.00	39.00
Malleable, Chicago†.....	46.50	46.50	46.50	39.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	62.46
Ferromanganese†	161.40	161.40	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

† Average of U. S. prices quoted on Ferroalloy page.

* Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap				
(per gross ton)				
Heavy melt'g steel, P'gh..	\$38.75	\$38.75	\$40.75	\$40.25
Heavy melt'g steel, Phila.	38.50	39.50	41.50	41.00
Heavy melt'g steel, Ch'go	34.50	34.50	39.50	38.75
No. 1, hy. comp. sh't, Det.	33.00	32.50	33.50	35.50
Low phos. Young'n.....	45.25	45.25	47.00	45.25
No. 1, cast, Pittsburgh...	51.50	57.50	59.00	59.50
No. 1, cast, Philadelphia.	44.00	46.00	51.00	65.50
No. 1, cast, Chicago.....	42.00	42.00	53.50	64.50

Coke, Connellsville:				
(per net ton at oven)				
Furnace coke, prompt...	\$15.25	\$15.25	\$15.25	\$12.50
Foundry coke, prompt...	16.75	16.75	16.75	14.00

Nonferrous Metals:				
(cents per pound to large buyers)				
Copper, electro, Conn.....	23.50	23.50	23.50	21.50
Copper, Lake Conn.....	23.625	23.625	23.625	21.625
Tin, Grade A, New York.	\$1.03	\$1.03	\$1.03	94.00
Zinc, East St. Louis.....	17.50	17.50	17.50	12.00
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex...	38.50	38.50	38.50	33.00

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)

Feb. 22, 1949	3.75628¢	per lb.....
One week ago	3.75628¢	per lb.....
One month ago	3.75628¢	per lb.....
One year ago.....	3.27585¢	per lb.....

	HIGH		LOW	
1949....	3.75628¢	Jan. 1	3.75628¢	Jan. 1
1948....	3.75700¢	July 27	3.22568¢	Jan. 1
1947....	3.19541¢	Oct. 7	2.87118¢	Jan. 7
1946....	2.83599¢	Dec. 31	2.54490¢	Jan. 1
1945....	2.44104¢	Oct. 2	2.54490¢	Jan. 2
1944....	2.30837¢	Sept. 5	2.21189¢	Oct. 5
1943....	2.29176¢		2.29176¢	
1942....	2.28249¢		2.28249¢	
1941....	2.43078¢		2.43078¢	
1940....	2.30467¢	Jan. 2	2.24107¢	Apr. 16
1939....	2.35367¢	Jan. 3	2.26689¢	May 16
1938....	2.58414¢	Jan. 4	2.27207¢	Oct. 18
1937....	2.58414¢	Mar. 9	2.32263¢	Jan. 4
1936....	2.32263¢	Dec. 28	2.05200¢	Mar. 10
1935....	2.07642¢	Oct. 1	2.06492¢	Jan. 8
1934....	2.15367¢	Apr. 24	1.95757¢	Jan. 2
1933....	1.95578¢	Oct. 3	1.75836¢	May 2
1932....	1.89196¢	July 5	1.83901¢	Mar. 1
1931....	1.99626¢	Jan. 13	1.86586¢	Dec. 29
1929....	2.31773¢	May 28	2.26498¢	Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

....	\$46.74	per gross ton....
....	\$46.74	per gross ton....
....	\$46.74	per gross ton....
....	\$40.37	per gross ton....
HIGH		LOW
\$46.82 Jan. 4	\$46.74 Jan. 25	
46.91 Oct. 12	39.58 Jan. 6	
37.98 Dec. 30	30.14 Jan. 7	
30.14 Dec. 10	25.37 Jan. 1	
25.37 Oct. 23	23.61 Jan. 2	
\$23.61	\$23.61	
23.61	23.61	
23.61	23.61	
\$23.61 Mar. 20	\$23.45 Jan. 2	
23.45 Dec. 23	22.61 Jan. 2	
22.61 Sept. 19	20.61 Sept. 12	
23.25 June 21	19.61 July 6	
23.25 Mar. 9	20.25 Feb. 16	
19.74 Nov. 24	18.73 Aug. 11	
18.84 Nov. 5	17.83 May 14	
17.90 May 1	16.90 Jan. 27	
16.90 Dec. 5	13.56 Jan. 3	
14.81 Jan. 5	13.56 Dec. 6	
15.90 Jan. 6	14.79 Dec. 15	
18.71 May 14	18.21 Dec. 17	

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

SCRAP STEEL

.....\$37.25	per gross ton.....		
.....\$37.58	per gross ton.....		
.....\$40.58	per gross ton.....		
.....\$40.00	per gross ton.....		
HIGH		LOW	
\$43.00	Jan. 1	\$37.25	Feb. 22
43.16	July 27	39.75	Mar. 9
42.58	Oct. 28	29.50	May 20
31.17	Dec. 24	19.17	Jan. 1
19.17	Jan. 2	18.92	May 22
19.17	Jan. 11	15.76	Oct. 24
\$19.17		\$19.17	
19.17		19.17	
\$22.00	Jan. 7	\$19.17	Apr. 10
21.83	Dec. 30	16.04	Apr. 9
22.50	Oct. 3	14.08	May 16
15.00	Nov. 22	11.00	June 7
21.92	Mar. 30	12.67	June 9
17.75	Dec. 21	12.67	June 8
13.42	Dec. 10	10.33	Apr. 29
13.00	Mar. 13	9.50	Sept. 25
12.25	Aug. 8	6.75	Jan. 3
8.50	Jan. 12	6.43	July 5
11.33	Jan. 6	8.50	Dec. 29
17.58	Jan. 29	14.08	Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

KEYWELL . . . DEPENDABLE SERVICE

for Over 30 YEARS

STAINLESS
STEEL

•
ELECTRIC
FURNACE

•
BLAST
FURNACE

•
CAST IRON

•
OPEN
HEARTH

MILL SUPPLIERS
OF
IRON & STEEL
SCRAP

Samuel G. Keywell

Herbert W. Smith

Barney L. Keywell

THE **SAMUEL G. KEYWELL CO.** INC.

2900 ST. JEAN, DETROIT 14, MICH., VALLEY 2-8800

PITTSBURGH OFFICES: 3111 JENKINS ARCADE BLDG., PITTSBURGH 22, PA.

E. CLYDE GRIMM, VICE-PRESIDENT — TELEPHONE: GRANT 8030

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 25¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio		Detroit	Johns- town	Seattle, S. Frisco, Los Angeles	Fontana
INGOTS Carbon forging	\$50.00														
Alloy	\$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling ^{1,2}	\$52.00				\$52.00	\$52.00	(per net ton)						\$52.00		
Carbon forging billets	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	(per net ton)						\$61.00		
Alloy	\$63.00	\$63.00				\$63.00	(Bethlehem, Canton, Massillon = \$63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.95 ^{1,3} 4.10 ^{1,4}	
SHEETS Hot-rolled ⁶	3.25 to 3.30	3.25	3.25	3.25- 3.30	3.25	3.25	3.25	3.25		Warren, Ashland = 3.25		3.45		3.95 ^{1,5}	5.65
Cold-rolled ¹	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton = 4.40	4.40	Ashland = 4.40			5.15 ^{1,5}	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long tenon ² (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled ³	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	5.90
Cold-rolled ⁴	4.00	4.25		4.00		4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb. ⁵ base box	\$7.75	\$7.75	\$7.75		\$7.85			\$7.85	\$7.95	Warren, Ohio = \$7.75				Pittsburg, Cal. = \$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct \$1.30, \$1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct \$1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct \$2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga. ¹⁰	5.30	5.30	5.30					5.40		Warren, Ohio = 5.30					
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton = 3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet) ⁷	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton = 3.35		3.35	4.05 to 4.10	5.30
Cold-finished ⁸	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon = 3.75				4.05	3.75	4.80 ^{1,4}	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65	Massillon = 4.65		Worcester 4.95					
PLATE Carbon steel ¹¹	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40	3.45 Cons	3.40 hohocken = 3.95	3.45 Coatesville = 3.75, Claymont = 3.95 Geneva = 3.40, Harrisburg = 6.50				3.65	3.45	4.30 ^{1,6}	5.80
Floor plates	4.55	4.55		4.55				Cons hohocken = 4.55							
Alloy	4.40	4.40						Coatesville = 5.10							
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30		Bethlehem = 3.30, Geneva, Utah = 3.25					3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE ⁹ Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth = 4.15, Worcester = 4.45				4.15	5.15 ^{1,3}	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester = 5.50 New Haven, Trenton = 5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingot, rerolling.....	12.75	13.50	15.00	15.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling.....	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings.....	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging.....	24.25-26.50	24.25-26.50	26.25-28.75	25.50-27.75	39.00-42.75	32.75-35.75	19.50-21.50	20.00-21.75	20.00-21.75
Bars, wire, structurals.....	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates.....	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets.....	37.50-40.75	37.50-40.75	39.50-43.00	39.50-43.00	53.00-57.25	50.00-54.00	33.00	33.50	35.50
Strip, hot-rolled.....	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled.....	30.50-30.75	33.00-33.50	36.50-39.50	35.00-35.75	55.00-57.25	48.50-50.00	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill					Base
W	Cr	V	Mo	Co	per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	\$1.42
18	4	2	—	—	\$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢
High-carbon-chromium.....					52¢
Oil hardened manganese.....					29¢
Special carbon.....					26.5¢
Extra carbon.....					22¢
Regular carbon.....					19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4¼¢ higher.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature.....	5.45 to 6.05
Electrical.....	5.95 to 6.55
Motor.....	6.70 to 7.95
Dynamo.....	7.50 to 8.65
Transformer 72.....	8.05 to 10.05
Transformer 65.....	8.60 to 10.60
Transformer 58.....	9.30 to 11.30
Transformer 52.....	10.10 to 11.35

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb.....	\$3.20†
Joint bars, 100 lb.....	4.25
Light rails (from billets) per 100 lb.....	3.55

Base Price
cents per lb

Track spikes.....	5.35
Axles.....	5.20
Screw spikes.....	8.00
Die plates.....	4.05
Die plates, Pittsburgh, Calif.*.....	4.20
Track bolts, untreated.....	8.25
Track bolts, heat treated, to railroads.....	8.50

*Seattle, add 30¢.

†CF&I and Inland, \$3.50.

C-R SPRING STEEL

Base per pound f.o.b. mill	
0.26 to 0.40 carbon.....	4.00¢
0.41 to 0.60 carbon.....	5.50¢
0.61 to 0.80 carbon.....	6.10¢
0.81 to 1.05 carbon.....	8.05¢
1.06 to 1.35 carbon.....	10.35¢

Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound		
	Plate	Sheet
Stainless clad		
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Aluminized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.		9.25

*Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails* 103	123	
Galvanized nails* 103	123	
Woven wire fence† 109	132	
Fence posts, carloads†† 114	...	
Single loop bale ties. 106	130	
Galvanized barbed wire** 123	143	
Twisted barless wire... 123	...	

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire†... \$4.80	\$5.75	
Annealed, galv. fencing† 5.25	6.20	
Cut nails, carloads†† 6.75	...	

† Add 30¢ at Worcester; 10¢ at Sparrows Pt.
†† Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dyn-alloy	Hi Steel	Mayari R	Otis-cology	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates.....	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.40	5.65
Sheets									
Hot-rolled....	4.95	4.95	4.95	5.25	4.95	4.95	4.95	5.15	5.25
Cold-rolled....	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.25	6.35
Galvanized....	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled....	4.95	4.95	4.95	.....	4.95	4.95	4.95	5.15	5.25
Cold-rolled....	.....	.....	6.05	.....	.....	6.05	6.05	.....	6.35
Shapes.....	.....	4.95	.....	.....	4.95	5.05	4.95	.....	.....
Beams.....	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled....	5.10	5.10	5.10	.....	5.10	5.10	5.10	.....	5.40
Bar shapes.....	.....	5.10	.....	.....	5.10	5.10	5.10	.....	.....

PIPE AND TUBING

Base discounts, f.o.b. mills,
Base price, \$200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, butt weld	Black	Galv.
1/2-in.	43 to 41	20 to 18
3/4-in.	46 to 44	24 to 22
1-in.	48 1/2 to 46 1/2	27 to 25
1 1/4-in.	49 to 47	27 1/2 to 25 1/2
1 1/2-in.	49 1/2 to 47 1/2	28 to 26
2-in.	50 to 48	28 1/2 to 26 1/2
2 1/2 to 3-in.	50 1/2 to 49 1/2	29 to 27

Steel, lap weld		
2-in.	39 1/2	17 1/2
2 1/2 to 3-in.	39 3/4	21 1/2
3 1/2 to 6-in.	46 1/2 to 42	20 1/2 to 24 1/2

Steel, seamless		
2-in.	38 1/2 to 27	16 1/2 to 5
2 1/2 to 3-in.	41 1/2 to 35	19 1/2 to 10 1/2
3 1/2 to 6-in.	43 1/2 to 38 1/2	21 1/2 to 16 1/2

Wrought Iron, butt weld		
1/2-in.	+20 1/2	+52 1/2
3/4-in.	+10 1/2	+41 1/2
1 & 1 1/4-in.	+4 1/2	+32 1/2
2-in.	+1 1/2	+23
3-in.	+2	+28 1/2

Wrought Iron, lap weld		
2-in.	+7 1/2	+36 1/2
2 1/2 to 3 1/2-in.	+5	+32
4-in.	list	+26
4 1/2 to 8-in.	+2	+27 1/2

EXTRA STRONG, PLAIN ENDS

Steel, butt weld		
1/2-in.	42 to 40	20 1/2 to 18 1/2
3/4-in.	46 to 44	24 1/2 to 22 1/2
1-in.	48 to 46	27 1/2 to 25 1/2
1 1/4-in.	48 1/2 to 46 1/2	28 to 26
1 1/2-in.	49 to 47	28 1/2 to 26 1/2
2-in.	49 1/2 to 47 1/2	29 to 27
2 1/2 to 3-in.	50 to 48	29 1/2 to 27 1/2

Steel, lap weld		
2-in.	39 1/2	18 1/2
2 1/2 to 3-in.	44 1/2	23 1/2
3 1/2 to 6-in.	48 to 44	23 to 27

Steel, seamless		
2-in.	37 1/2 to 32 1/2	16 1/2 to 11 1/2
2 1/2 to 3-in.	41 1/2 to 36 1/2	20 1/2 to 15 1/2
3 1/2 to 6-in.	45	24

Wrought Iron, butt weld		
1/2-in.	+16	+46 1/2
3/4-in.	+9 1/2	+39 1/2
1 to 2-in.	+1 1/2	+28 1/2

Wrought Iron, lap weld		
2-in.	+4 1/2	+33
2 1/2 to 4-in.	+5	+21 1/2
4 1/2 to 6-in.	+1	+26

For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD Gage	Seamless	Electric Weld		
In in. BWG	H.R.	C.R.	H.R.	C.D.
2 13	19.18	22.56	18.60	21.89
2½ 12	25.79	30.33	25.02	29.41
3 12	28.68	33.76	27.82	32.74
3½ 11	35.85	42.20	34.78	40.94
4 10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	\$106.70
6 to 24-in., del'd N. Y.	103.50 to 108.40
6 to 24-in., Birmingham	93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	120.30
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
1/2 in. & smaller x 6 in. & shorter	35
9/16 & 5/8 in. x 6 in. & shorter	37
3/4 in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Flow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller	35
9/16 to 1 in. inclusive	34
1 1/4 to 1 1/2 in. inclusive	32
1 1/2 in. and larger	27
On above bolts and nuts, excepting	
plow bolts, additional allowance of 15 pct	
for full container quantities. There is an	
additional 5 pct allowance for carload	
shipments.	

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	41	
1/2 in. and smaller	38	
1/2 in. through 1 in.	39	
9/16 in. through 1 in.	37	
1 1/4 in. through 1 1/2 in.	35	37
1 1/2 in. and larger	28	
In full case lots, 15 pct additional discount.		

Stove Bolts

Packages, nuts separate	\$61.75
In bulk	70.00

Large Rivets

(1/2 in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
1/4 to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluor spar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	\$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20
After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.	

METAL POWDERS

Per pound, f.o.b. shipping point, in to lots, for minus 100 mesh.

Swedish sponge iron c.l.f.	7.9¢ to 9.0¢
New York, ocean bags...	
Domestic sponge iron, 98+ % Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+ % Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+ % Fe...	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to \$1.7
Aluminum	31.00
Antimony	51.17
Brass, 10 ton lots	27.25 to 37.25
Copper, electrolytic	33.625
Copper, reduced	34.25
Cadmium	\$2.4
Chromium, electrolytic, 99% min.	\$3.5
Lead	28.00
Manganese	60.00
Molybdenum, 99%	\$2.6
Nickel, unannealed	67.00
Nickel, spherical, minus 30 mesh, unannealed	68.00
Silicon	34.00
Solder powder	8.5¢ plus metal cos
Stainless steel, 302	75.0
Tin	\$1.15
Tungsten, 99%	\$2.9
Zinc, 10 ton lots	17.75 to 22.25

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$15.00 to \$15.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.00 to \$17.50
Foundry, Byproduct	
Buffalo, del'd	\$22.91
Chicago, f.o.b.	20.44
Detroit, f.o.b.	19.41
New England, del'd	23.81
Seaboard, N. J., f.o.b.	21.51
Philadelphia, f.o.b.	21.01
Swedeland, Pa., f.o.b.	21.01
Painesville, Ohio, f.o.b.	20.91
Erie, del'd	\$21.50 to 23.51
Cleveland, del'd	22.41
Cincinnati, del'd	21.51
St. Paul, f.o.b.	23.51
St. Louis, del'd	20.91
Birmingham, del'd	18.61

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Md., Ky., Mo., Ill. (except Salina, Pa., add \$5)	\$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	\$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	\$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	
Standard chemically bonded, Balt., Chester	\$69.00
Magnesite Brick	
Standard, Balt. and Chester	\$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

	Std. 3/4-in. grains
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	\$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	\$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢	\$12.25
--	---------

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 15¢ to base price except Cincinnati and
New Orleans (*), add 10¢; New York, add 20¢.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.85-7.11	5.37	....	5.56	5.36	5.42	6.16	....	10.10	....	....
Birmingham	5.05	....	6.45	5.05	6.68	5.25	5.00	5.00	6.68	....	....	....	....
Boston	5.55	6.45-6.75	7.71-7.85	5.65-5.95	6.75	5.80	5.42	5.52	6.27	9.64-9.82	10.04-10.07	11.23-11.27	11.47-11.52
Buffalo	4.85	5.00-5.75	7.26-7.70	5.29-5.65	6.35-7.27	5.35	5.10	5.05-5.15	5.80	9.70-9.73	9.85-9.98	11.15-11.18	11.40-11.43
Chicago	4.85	5.75	7.10	4.85	6.68	5.10	4.90	4.90	5.70	9.35-9.50	9.60-9.75	10.80-10.90	11.06-11.16
Cincinnati	5.16-5.28*	6.13*-6.18	7.53	5.28*-5.55	....	5.53*-5.63	5.40*-5.48	5.33*-5.55	6.09*-6.10	9.74	9.99	11.19	11.44
Cleveland	4.98-5.16	5.75-6.06	7.20-7.46	5.03-5.15	....	5.37-5.54	5.16-5.47	5.17-5.34	5.90-5.97	9.49-9.66	9.74-9.81	10.95-11.07	11.10-11.32
Detroit	5.28-5.32	6.07-6.18	7.53-7.58	5.28-5.47	6.27-6.58	5.53-5.57	5.40	5.33-5.55	6.01-6.10	9.69-9.82	9.84-10.07	11.11-11.14	11.36-11.39
Follansbee	4.85	5.75	7.15	....	6.00	....	....	....	....	....	....	....	....
Houston	6.50-6.70	....	8.50	7.00	....	6.70	6.55	6.65	7.60	10.30	10.25	11.45	11.70
Los Angeles	6.45-6.60	7.90-8.05	8.75-8.90	6.65-6.80	9.35 ⁵	7.45-7.60	5.95-6.10	6.10-6.25	7.95-9.35	10.95-11.60	10.90-11.55	12.45-12.95	12.70-13.20
Milwaukee	5.03	5.93	7.28	5.38	6.86	5.28	5.08	5.08	5.87-5.88	9.53	9.78	10.98	11.28
New Orleans	5.95*	6.75*	....	6.15*	....	6.15*	5.95*	5.95*	6.65*	....	....	....	....
New York	5.40-5.51	6.46	7.71-7.86	5.62-5.72	....	5.70-5.81	5.33-5.61	5.57-5.60	6.41	9.73-9.91	9.98-10.16	11.18	11.43
Norfolk	5.80	....	6.05	....	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	5.92	....	9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Philadelphia	5.15-5.44	6.36-6.79	7.33-7.43	5.35-5.45	6.74	5.38	5.10	5.40-5.45	6.19	9.50	9.75-10.34	10.95	11.20
Pittsburgh	4.85-4.90	5.75 ¹	7.15-7.70	5.10	6.00	5.20-5.25	4.95-5.15	5.00-5.10	5.65	9.35	9.60	10.40	11.30
Portland	6.50 ⁴	8.00 ²	8.15 ² -8.45 ²	6.85 ⁴	....	6.30 ⁴	6.25 ⁴	6.25 ⁴	8.25 ⁴	....	10.45 ¹⁵	....	12.05 ¹⁵
Salt Lake City	7.05-8.00	8.20	7.90-9.06	7.10-7.70	....	5.75-6.85	6.65-7.00	6.95-7.25	7.40-7.55	....	....	....	....
San Francisco	5.95-6.00	7.15-7.85	8.25-8.70	6.75	....	7.60	5.90	5.90	7.55	10.90	10.85	10.40	12.65
Seattle	6.20 ⁴ -7.10 ⁴	7.75 ² -8.65 ²	7.65-9.15 ²	6.55 ⁴ -6.70 ⁴	....	6.20-6.35 ⁴	6.15-6.30 ⁴	6.05 ⁴ -6.20 ⁴	8.00 ¹⁴ -8.15 ¹⁴	....	10.30 ¹⁵ -11.35 ¹⁵	....	12.00 ¹⁵ -14.10 ¹⁵
St. Louis	5.21-5.37	6.12-6.27	7.47-7.52	5.22-5.97	8.68	5.47-5.62	5.27-5.42	5.27-5.92	6.07-6.22	9.72	9.97	....	11.42
St. Paul	5.44	6.19-6.34	7.74	5.44	6.82	5.64-6.69	5.49	5.49	6.29	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

COLD-ROLLED:

Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:

1000 to 1999 lb.

GALVANIZED SHEETS:

450 to 1499 lb.

EXCEPTIONS:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb.

HOT-ROLLED:

Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	....	....	....	....
Birmingham	42.88	43.38	....	....	....
Buffalo	47.00	47.00	47.50	....	....
Chicago	46.00	46.00	46.50	47.00	....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	....
Erie	46.00	46.50	46.50	47.00	....
Everett	....	52.75	53.25	....	....
Granite City	47.90	48.40	48.90	....	....
Ironton, Utah	46.00-55.00	46.50-55.50	....	....	....
Lone Star, Texas	....	75.00 [†]			
Neville Island	46.00	46.50	46.50	....	....
Geneva, Utah	46.00	46.50	....	....	....
Sharpsville	46.00	46.50	46.50	47.00	....
Steeltown	46.00	46.50	49.00	49.50	54.00
Struthers, Ohio	46.00	....	....	....	....
Swedeland	50.00	50.50	51.00	51.50	....
Toledo	46.00	46.50	46.50	47.00	....
Troy, N. Y.	....	....	....	....	54.00
Youngstown	46.00	46.50	46.50	....	....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	\$0.50 Arb.	....	52.75	53.25	....	....
Boston	Steeltown	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Bethlehem	3.90	51.90	....	....	....	....
Cincinnati	Birmingham	6.09	48.97	49.46	....	....	....
Jersey City	Bethlehem	2.39	50.39	....	....	....	....
Los Angeles	Geneva-Ironton	8.93	52.93-61.93	53.43-62.43	....	....	....
Mansfield	Cleveland-Toledo	3.03	49.03	49.53-49.03	49.53	50.03	54.03
Philadelphia	Bethlehem	2.21	50.21	....	....	....	....
Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	....
Philadelphia	Steeltown	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Geneva-Ironton	6.93	52.93-61.93	53.43-62.43	....	....	....
Seattle	Geneva-Ironton	6.93	52.93-61.93	53.43-62.43	....	....	....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	....	....

† Low Phos, Southern Grade

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. 32 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —\$59.50; f.o.b. Buffalo, \$60.75. Add \$125 per ton for each additional 0.50 pct Si up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferro-silicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, \$73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.	
F.o.b. Birmingham	\$162
F.o.b. Niagara Falls, Alloy, W. Va., Westland, Ont.	\$160
F.o.b. Johnstown, Pa.	\$162
F.o.b. Sheridan, Pa.	\$160
F.o.b. Etna, Pa.	\$163
\$2.00 for each 1% above 82% Mn; penalty, \$2.00 for each 1% below 78%.	
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.	
Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.	
16-19% Mn	19-21% Mn
3% max. Si	3% max. Si
Palmerton, Pa.	\$61.00
Pgh. or Chicago	\$62.00
	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.	
Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.			
	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C			
7.00% max. C	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.	
Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth \$84.00, foundry, \$85.00; \$84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50 pct. Mn over 1 pct.	
---	--

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.	
96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.	
Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.	
25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.			
	Cast	Turnings	Distilled
Ton lots	\$2.05	\$2.95	\$3.75
Less ton lots..	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered.	
(65-72% Cr, 2% max. Si)	
0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35
Briquets—Contract price, cents per pound of briquet, delivered, 60% chromium.	
Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.	
--	--

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.	
High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.	
0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.	
30-33% Ca, 60.65% Si, 3.00% max. Fe.	
Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.	
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.	
Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.	
Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	\$2.25
Ferrovandium, 35-55%, contract basis, delivered, per pound, contained, V.	\$2.90
Openhearth	3.00
Crucible	3.10
High speed steel (Primos)	
Vanadium pentoxide, 88-92% V ₂ O ₅ , contract basis, per pound contained V ₂ O ₅	\$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	\$2.90
Ton lots	2.95
Less ton lots	
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	\$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	\$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	\$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads, per net ton	\$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.90¢
Ton lots	9.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00¢
Ton lots, packed	11.25¢
Less ton lots	11.75¢
Boron Agents	
Contract prices per pound of alloy, delivered.	
Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	\$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	\$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.: freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	\$6.25

Higher Frequencies Are Made Possible By "Regimented" Atoms

Pittsburgh

• • • How "regimented" atoms produce greatly improved properties in magnetic materials and point the way to more powerful ultrasonic devices was disclosed here recently before the Physical Society of Pittsburgh. Dr. J. E. Goldman, of the Westinghouse Research Laboratories, revealed experiments showing that certain alloys whose atoms are in an "ordered state" have much better magnetic properties than metals with "disordered" atomic structure.

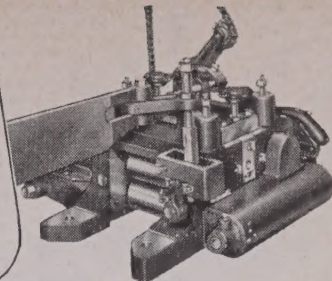
This improvement in magnetic properties, he reported, may also improve the ability of such metals to produce more powerful sound waves. Such sound generators—called magnetostrictive oscillators—are used to destroy bacteria or in underwater work to safeguard navigation or map the ocean floor.

The atoms of metals in their natural state exist in a random manner, Dr. Goldman explained, but can be "lined up" by special heat treatment. "We discovered that when the atoms were thus neatly arranged the magnetostriction effect was greatly improved. A rod of this metal, when subjected to an alternating magnetic field, will actually expand and contract a tiny fraction of an inch. This magnetic 'push-pull' effect is called magnetostriction."

By magnetizing such rods with a high-frequency alternating current, the scientist explained, they can be made to vibrate up to hundreds of thousands of times a second and generate ultrasonic waves. "With the best standard materials, the rod may contract and expand about 1/30,000th of its length. When the atoms of the special alloy we investigated are lined up, however, the rod may be 'stretched' even more than this distance. Correspondingly, the sound waves emitted may be two or three times more powerful.

"In brief," Dr. Goldman explained, "the theory states that the magnetic behavior of metals and alloys is determined largely by the position of the atoms that make it up.

Assures
Fast—Safe—Accurate
Feeding of
Coiled Strip Stock



WITTEK *Automatic*
ROLL FEEDS AND REEL STANDS

For All Types of Punch Presses

Wittek Automatic Roll Feeds provide maximum efficiency in the high speed automatic feeding of all types of coiled strip stock to punch presses. Highly flexible in function and application, they are capable of feeding lengths up to 24" per stroke of the press and will handle various stock thicknesses in widths up to the maximum width of the rollers.

Wittek Adjustable Reel Stands provide automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and back lash of stock. If your production problem involves feeding coiled stock to punch presses, consult us. Your inquiry will be given immediate attention. Ask for completely descriptive catalog.

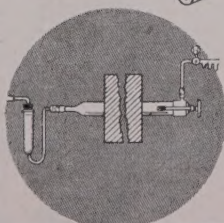
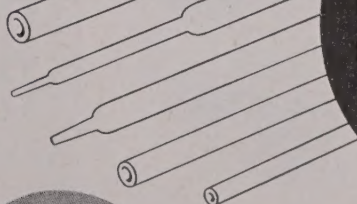
WITTEK Manufacturing Co.
4305-15 W. 24th Place, Chicago 23, Illinois

Automatic
ROLL FEEDS
and
REEL STANDS



Longer Life with...

MCDANEL
High Temperature
COMBUSTION
TUBES



MCDANEL
Refractory
Porcelain Co.
Beaver Falls
Penna.

McDaniel Porcelain Combustion Tubes and Zirco Tubes are precision made. Density, bore size, wall thickness, etc. are carefully controlled to assure maximum resistance to thermal shock, accurate fit and gas tightness. Cast as a single unit, they defy devitrification—give longer service and lower replacement costs. For carbon and sulphur determinations, McDaniel Tubes are tops.

Leading metallurgists in the steel and iron industries say: "McDaniel Tubes stand up well under extremes in temperature"—"Never spall or blister"—"Highly satisfactory in every respect".

Specify McDaniel High Temperature Porcelain Combustion Tubes and Zirco Tubes from your supplier.

OTHER MCDANEL PRODUCTS

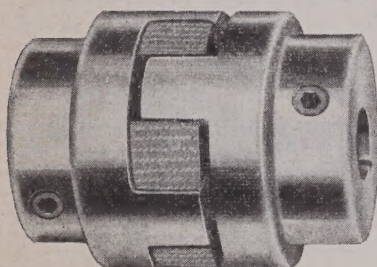
- Non-spalling, non-blistering, gas tight Combustion Tubes.
- High Temperature Zirco Tubes.
- Self Cooling Combustion Tubes.
- Refractory Porcelain Specialties in stock or designed to meet your needs.



FLEXIBLE COUPLINGS

FOR STEADY POWER FLOW
PRACTICALLY MAINTENANCE FREE
NO TEARDOWNS FOR CHANGING

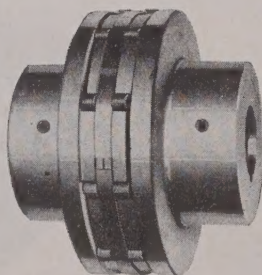
ALL THE WAY FROM LITTLE PUMPS



Lovejoy L-R Type "A"
1/6 to 50 h.p. for
small pumps, fans,
washing machines, etc.
Only 3 parts.

TO BIG STEEL MILLS

Lovejoy Type "W",
2 to 2500 h.p.
for heaviest duties.



Free-floating resilient load cushions are suspended between rugged metal jaws, instantly adjusting to every emergency of misalignment, vibration, oscillation, backlash, surge and shock. Simplest most dependable construction. Various cushion materials furnished to meet requirements of service, all weathers inside or out, fumes, oil, moisture. Remarkable for noiselessness.

DELIVERIES FROM STOCK.

Send for complete catalog and Quick-Finding Selector Charts.

Charts put your finger on the particular couplings you need without tedious figuring. Prices, weights and engineering data right at hand. Phone, wire, or write



LOVEJOY FLEXIBLE COUPLING CO.

Also Mfrs. of Lovejoy Variable Transmission Controls and Dix Universal Joints
5066 W. LAKE STREET, CHICAGO 44, ILLINOIS

BRASS PIPE AND TUBE FITTINGS



Made from Forgings, Extruded Rod and Castings for use in AUTOMOTIVE, REFRIGERATION, MARINE, MACHINE TOOL, STOVE and Industrial applications



- Flared Tube Fittings
- Compression Fittings
- Iron Pipe Thread Fittings
- Inverted Sleeve Fittings
- Threaded Sleeve Fittings



"BUILT RIGHT TO STAY TIGHT"

Send for Catalog 45

Commonwealth
BRASS CORPORATION
COMMONWEALTH AT GRAND TRUNK R.R., DETROIT, 8, MICH.



MUNDT PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can perforate almost any size perforation in any kind of metal or material required. Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

Write for New Catalog of Patterns



TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, ANY METAL, ANY PURPOSE

CHARLES MUNDT & SONS
59 FAIRMOUNT AVE. JERSEY CITY, N. J.